The Chemical Age

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World Problems

THE President of the British Association has urged those whose interests lie in the scientific field to eschew the narrow path wherein they and their forefathers trod and to interest themselves in the affairs of mankind at large. He is right, and never more right than when addressing those admonitions to the industrial chemist. The industrial chemist must keep his attention for the most part on the daily round of his particular task, but his usefulness is immensely enhanced if he will allow his attention to wander so that he may be able to interpret industry in terms of the wants of mankind, and assess the probable trend of markets in the light of events. Politics and industry are closely interwoven; for example, the synthetic production of citric acid on the large scale is not unconnected with events in Spain and Abyssinia. The change in the political governance of India may ultimately stimulate the demand for many of the goods that Europeans enjoy.

The month that has just passed has seen a possibly fundamental change in the outlook of the civilised world towards the currency problem. Several Governments have abandoned the gold standard, the persistence of which has for so long prevented reciprocal trade between certain countries. In doing so the French Government has announced that the success of its efforts to maintain currency stability is linked with the development of international trade. The Governments of Britain, the United States and France attach the greatest importance to action being taken without delay to relax progressively the present system of quotas and exchange controls with a view to their abolition. We cannot wholly rid ourselves of economic nationalism, because the canker has eaten too deeply, but at least the lead that has been given should enable a start to be made towards getting the wheels of international trade to run more smoothly. The numerous World Economic Conferences have failed completely to achieve anything tangible in this direction, but the less ambitious efforts of our own statement in the directions of trade agreements have been found to be far more fruitful. Now we have a new and wider-based attempt with the avowed intention, in the words of its authors, to " contribute to the restoration of order in international economic relations, and to pursue a policy which will tend to promote prosperity in the world and to improve the standard of living." Whatever way we look at the monetary events of the past month, at the very least they open a real prospect of negotiations which may lead by gradual steps to effective economic co-operation between the nations, and at the best to a considerable revival of international trade. There are few countries more vitally interested in the resumption of international trade than Great Britain. We and the Dominions may be able to live in a world of economic self-sufficiency, if the attempt be made, but we do not desire to do so, and that is not the way towards the greatest prosperity nor the highest standard of living. The products of the chemical industry are distributed in every part of the world; its raw materials are of world-wide distribution.

The new measures are particularly opportune; far less power is needed to accelerate motion that has commenced than to initiate movement from rest. M. Avenol has lately made a report on the economic situation to the League of Nations, in which he declares that all the evidence goes to show that the depression has given way to a persistent and accelerating, if uneven, recovery, spreading gradually over an ever-increasing area. The tide of recovery, states the report, is flowing strongly, and it is difficult to-day to find a single country in which signs of recovery are wholly absent.

Moreover, in many countries industrial production is greater than it ever has been, and that is not due to expenditure on armaments as is evident because recovery started before the expenditure on armaments was undertaken and those countries that are spending most on armaments are not necessarily those where recovery is most marked. That is a conclusion of the greatest importance, because many people are suspicious of the present much improved state of trade on the ground that it is but a St. Martin's summer, induced by unproductive Government expenditure. In the report, which was published before the announcement of the new monetary policy in France and other gold-bloc countries, the significant (though well-recognised) statement was made that revival of international trade is interlinked with monetary and exchange problems, and trade cannot revive if it is strangled by quantitative restrictions on the international movement of goods.

In 1935, for the first time since 1929, the value of world trade (defined as imports plus exports) rose slightly by 1.9 per cent. in terms of gold, or by 5.3 per cent. in terms of sterling. Nevertheless, and possibly because of the disturbed political situation, the trade of Europe decreased by 2 per cent. in gold value in 1935, whereas the trade of other continents increased by 6 per cent. It can be taken as certain that we shall not get back to really satisfactory international trading until the political situation is sufficiently quiet to encourage international lending of capital, instead of the present rather frantic rush of short-term funds in search of safety rather than of profit. But a start has been made and if the war clouds can be kept away we may view the future with a good deal of optimism.

Notes and Comments

Ten Years of I.C.I.

THE tenth birthday of Imperial Chemical Industries will fall in January next. It was ten years ago this month that the proposed merger of the four great chemical firms, the British Dyestuffs Corporation, Brunner, Mond and Co., Nobel Industries, Ltd., and the United Alkali Co. was first announced to the public. Preliminary negotiations had already been completed, agreement in principle having been reached between the leaders of the organisations concerned. During the latter part of 1926 experts were busy working on the mass of detail involved in the unification of administration and the consolidation of capital, a task demanding skill both in negotiation and financial understanding. The imposing headquarters of the new company at Millbank had not been built, but early in 1927 a start was made with what has come to be regarded as one of London's finest business buildings. It is of interest to recall that, as recorded in THE CHEMICAL AGE at the time, Imperial Chemical Industries had " the advantage of placing before its thousands of employees a thoroughly considered, organised, practical and progressive scheme which could not fail to be beneficial to them and to the industry generally." The history of the four individual companies afforded sufficient proof that the scheme had been drawn up in a spirit of justice, fairness and goodwill and that it constituted a workers' charter that would stand as a shining example to employers and employed in every other great industry. " Stand together, work together and benefit together " was the slogan which it was predicted would carry the company to an unparalled period of prosperity.

The Structure of Benzene

ONE of the foremost of the problems of organic chemistry yet unsolved is the subject of an important research now being undertaken at University College, London—the structure of the benzene molecule. A series of eight papers emanating from University College has been published in the July issue of the " Transactions of the Chemical Society," and a ninth paper appeared in the August issue. There have been propounded at least six suggested arrangements for disposing of the third carbon valency since Kekulé put forward the first " guess " in 1867. All these postulated a ring structure. Kekulé proposed double bonds linking the C atoms 2-3, 4-5 and 6-1; Dewar linked 2-3, 1-4 and 5-6; Claus linked the alternate opposite C atoms 1-4, 2-5 and 3-6; Ladenburg proposed double bonds between 1-4, 2-6 and 3-5. Thick put forward a curious loose linking between every adjacent atom and Baeyer suggested that the free fourth valency was directed towards the centre of the ring. It is difficult to see how ingenuity of arrangement can provide anything more in two dimensions than these six. The configuration of the normal benzene molecule is a problem in experimental stereochemistry, according to the present authors, which has only been attacked seriously hitherto by the method of crystal analysis, which lead to disturbance of the molecule by lattice forces. The two methods available are those of electron interferometry and long-wave spectroscopy. The latter method has been used in the present investigation and in a way so novel as to be worth noting. This method has recently been given an access of power in its application to hydrogen-containing compounds from the discovery and isolation of the isotype of hydrogen, deuterium.

Substitution of Deuterium

PRACTICALLY the whole effect of the substitution of deuterium for hydrogen on the vibration frequencies arises from the known changes of certain atomic masses. If some molecular model be postulated, numerical relationships can be calculated between the frequencies of corresponding normal vibrations in the two isotopically related molecules; comparison with the observed frequencies enables the correctness of the model structure to be tested. A start was made with C_6H_6 and C_6D_6 as being the two most symmetrical benzenes, a method having first been discovered whereby by the exchange reaction between benzene and sulphuric acid C_6H_6 could be prepared in a high state of purity. This method has been described in " Nature," 1934, vol. 134, p. 734. Other compounds were then investigated, these in turn being s-$C_6H_3D_3$, p-$C_6H_4D_2$, 1 : 2 : 4 : 5-$C_6H_2D_4$, and so on with other deuterobenzenes. These were examined for the near infra-red spectrum, the Raman spectrum, the ultra-violet fluorescence spectrum and the ultra-violet resonance spectrum. The general conclusion reached up to the present is that we are no longer bound to assume that a centre of symmetry is absent in the benzene molecule, though no proof has been given that it is present. The investigation supports the plane, regular, hexagonal model, the most symmetrical of all models, but gives no support for the Kekulé model. Organic chemists will look forward to further papers on this subject from University College.

Bank Holidays and Wages

SO far as the households of workers employed by Imperial Chemical Industries, Ltd., are concerned, Bank Holidays will not in future mean short wages. That, in brief, is the effect of a new agreement recently entered into between the company and the various trade unions. Industrial workers generally get paid only when they work, and leaner pay bags are the inevitable accompaniment of Bank Holidays. Staff grade workers in Imperial Chemical Industries have always been protected against loss of wages on these grounds, and the new agreement extends the same protection to all grades of workers and covers all " public holidays," including the six usual public holidays and any other day declared by the King as a public holiday. It is to be noted that the agreement does not promise all I.C.I. workers an extra six days' wages in each year, but it says that any worker who would otherwise lose wages by reason of a holiday shall not, in fact, lose. Those workers, for example shiftmen, whose wages are not endangered by public holidays, are not affected by the agreement; they will work as usual and get their overtime rate as they do at present. The same thing applies to any other workers who are able to work on any of the days in question.

The Stampede of the British Ass to Blackpool's Floodlit Swings and Roundabouts—II

By PROFESSOR H. E. ARMSTRONG

THE British Association would seem this year to have furnished a long-awaited interpretation of a hitherto mysterious passage in one of the most remarkable allegorical poems of Victorian times:

"They threatened its life with a railway share."

What indeed could be the action suggested in these strange lines of Oxford Writ, followed as they were by:

"They charmed it with smiles and soap."

All is now clear—it was the story, in advance, of the B.A. at Blackpool, A.D. 1936, even provided with a most illuminating map, that of the Bellman's Ocean Chart:

"A perfect and absolute blank."

Many have lost by railway shares: to what extent they have caused loss of life is difficult to say: if taken to typify mechanisation, at no distant date they must lead to the downfall of civilisation. A Smuts alone cannot save it: to lead us we need more than one man of intelligence, prepared to help on the proper use of our present vast fund of knowledge. The nations are fast being deprived of the right to think for themselves. A rational democracy will soon be impossible.

The kind of "smiles and soap" administered to Sir Josiah Stamp's confiding troup of camp followers is duly set forth in the *Orange Book* published during the meeting by the Association (pp. 240, price 3s. 6d.). Covers are often cryptic. The B.A. cover is no exception. From the index it carries we seem to learn that the subject considered was *The Impact of Science upon Sir Josiah Stamp Society*. This is a strangely assorted body of thirteen persons, one a woman. We cannot congratulate him entirely upon his associates. The *Athenæum*, in its new guest house, equates one woman with nine men; the B.A. seems to put a lower value upon men. Looking down the list we do not dispute the valuation.

A Woman's Address

Probably, if we could read the full meaning into it, the woman's address (Miss D. A. E. Garrod, "The Upper Palæolithic in the Light of Recent Discovery") would be found to be the most significant of all. Carlyle has defined man as a "tool-using animal." His first real tools were made from flint. The great industrial progress during the past two centuries has been due to the increased power derived from the development of machine tools made from a more than flint-hard steel. The curve must now fast fall down. Man's decadence cannot but follow his changeover from a tool-using animal into one that is used by tools—with no longer any real use for his hands. Whatever relief from labour, whatever leisure he may gain, will be offset by his loss of intellect; his popular amusements only serve to plunge him more deeply into thoughtless slavery to the machine.

Miss Garrod's address is purely technical—one that enables her to show her learning: she might have drawn a cultural picture that would have been of intense interest even to the ordinary Blackpool reader. Written in clear English, in a way that intelligent persons could understand, it might well have been taken as the Presidential Address. This leads me to suggest that a far better policy than that hitherto followed would be to appoint several persons to write addresses for a given meeting. These should be read and a ballot taken: the declared winner of the popular vote would thereafter figure as having been president of the meeting. This would introduce an element of competition into the meetings: it might even encourage a little mild betting. If special approval were given to any one of, say, seven efforts, at least some idea would be gained of the way in which the public cat was jumping. The further experiment of taking one of the addresses as read would allow an opinion to be formed as to the popularity of such a procedure—possibly it would rank first in the final ballot. The present practice is invidious. However, all this is to assume that the Association can go on holding its pretentious picnics: can it?

Although it was to be hoped that the desire of the Council to bring the Association into line with the public would have met with support, it was to be feared from the encyclical issued in the summer that there might be a tendency at work to reduce the freedom of action of the sections and coerce them too narrowly. The converse holds. The addresses are mostly in the good old style. There is no evidence of any desire to work to a common end—they are as individualistic as ever. When they are good (two or three of them) they are very, very good: the others are little short of horrid. Sir Josiah must have felt that he could not work with his Society as a board of directors: such an unpractical body would never have helped him to carry millions to Blackpool.

The New Honorary Secretary

The prize this year falls to Section A—to Professor Alan Ferguson, the newly elected honorary secretary of the Association, a fact of no slight significance. He stands out as an Olympian making no compromise with the future. He deals with the most abstruse problems of the day, under the title *Progress in Modern Physics*, with a clearness and insight that should appeal to all higher students. Actually, the subject considered is modern *Ultraphysics* (metaphysics). Physics is all but a lost art, in these days at least, it has no advertising value.

The address should serve as a model for literary study. The greatest care is taken to give to each verb its proper prepositional qualification. We learn that a new verb has been coined—to quantise: this is carefully spelt in italics with an S, following the A.P.H. law—instead of the Z flamboyantly adopted by the aristocratic *Times*. A.P.H. will be glad to learn that the ultra-physicists are engaged in knocking things into a "cocked-hat curve" which has revolutionised physical science: incidentally it has provided our language with this new verb—whether it be needed is open to question.

What do we mean, asks Professor Ferguson, when we speak, for instance, of quantising energy? "To quantise a physical quantity is to restrict its magnitude to a number of discrete, separated values, which are integral multiples of a certain selected unit." In other words we now throw energy about in lots—like snowballs, treating it as matter. We can't get away from our youth. Unfortunately, the chemist sees something more than mere quantity of stuff in these castaways—they have special and peculiar affinities.

Physicists Still Primitives

The physicists are still primitives—just ball throwers. Professor Ferguson, discussing the photo-electric effect—the loss of charge of an insulated, negatively charged plate of zinc when exposed to ultra-violet light, takes the mechanical, physical view and never considers the part played at the irradiated surface by chemical interchange (hydroxylation). The physicist to-day is without chemical feeling.

Literary critics are constantly calling upon us to consider the beauty in words. Some of us unfortunately find the beauty empty of meaning. We should like a Desmond MacCarthy to give his opinion on some of the passages in Professor Ferguson's essay. The language is perfect—but how many will understand it? For example:

"Early in the nineteenth century, discoveries, mainly in the realm of chemistry, gave fresh interest to atomic doctrines and

the simple concept of the billiard-ball atom proved to be brilliantly successful in explaining old happenings and in predicting new ones. It is not immediately obvious that an extrapolation of those laws which described the motions of bodies of the dimensions of a locomotive or a planet down to bodies of the indescribably minute dimensions given to an atom or molecule is likely to be successful in subsuming certain perceptual events; the extraordinary thing is, not that such an extrapolation should break down somewhere but that it should have any validity at all. And the triumphs to be put to the credit of the hypothesis are sufficiently remarkable as any treatise on the kinetic theory of gases will testify."

"Subsuming certain perceptual events"; very beautiful, but should not something far simpler have been "subsumed" for service at a tripper's resort.

The Student a Mere Machine

Those of us who know the writer can far better picture him using the homely tongue current at Blackpool. Discussing *Trends in Modern Physics* he might have referred to the ever-growing tendency to put chemistry with its facts aside—to pay no attention to the simple problems of electrochemical change. The student is becoming a mere machine for collecting text-book statements—he has no reasoned knowledge based upon experience. There is no study of natural philosophy in these days.

Professor Philip's address in the Chemical Section (B) has been brought under notice in these columns. It deserves discussion apart. We would wish that it had been more emphatic—more in the fervent, vigorous style of the incomparable lead he gives in singing *Auld Lang Syne*. If we be not careful, true chemistry may easily ere long be a matter of the past. Kolbe showed true vision when he took exception to van't Hoff's introduction of metaphysics into our subject. His judgment may have been narrow, but the few of us who can look back to those days and appreciate the departure that was made cannot but feel that he foresaw a great coming danger.

The address in Geology is a treat—certainly the best delivered at the meeting. It should be reprinted and put on sale as a penny pamphlet at the Geological Museum, South Kensington. The success that has attended the efforts of the staff there to make the subject speak for itself is almost sensational, in view of the long neglect of the subject by schools. A great object lesson in education is quietly coming to the fore.

A Fascinating Story

It is delightful to see Professor Hawkins endeavouring to spell out sermons of life from his stones. I am specially pleased to see that he calls attention to Arthur Rowe's work on *Micraster* and other typical organisms in the chalk, discussing these as evidence of evolution. The story he tells of the way in which the shell takes command of the oyster is fascinating. The chemical problems behind these changes are of infinite interest. The tendency to lay on chalk-stuff of some organisms is irrestible and has led to their final disappearance. We have to remember that, like the egg-shell, that of the sea urchin is living substance, the production of shell a complex operation. The change may come from within or from the water without—the ocean may well have changed essentially in composition since cretaceous times began. The change in *Micraster* is striking, in that the course of evolution, as Professor Hawkins remarks, seen in a long succession free from appreciable external influence, proves to be straight or at least direct. There is a continual growth in size together with an increased complexity and beauty of pattern—but this is repetitional, like that in benzenoid compounds. In *Micraster* I seem to see a gradual change similar to that from *Quinone* to, say, *Jade Green*.

The attempt to deal with Evolution by Julian Hixley is in striking contrast with that of the palæontologist—as different as chalk from cheese. Had grandson followed the example of grandfather, set out in his celebrated lecture on *A Piece of Chalk*, he would have been well advised. Chalk now needs special protection because, as at Margate, its beauty is being concealed by a stony compost and the cliffs deprived of all natural charm: contrariwise it is no longer known to every carpenter. The chalk-using carpenter of whom Huxley spoke is all but defunct; even lime is no longer slaked in public. Julian Huxley was told by his grandfather, in his youth, that some people see a great deal and some see very little in the same thing. If he do not see too much in Zoology he at least attempts to see far too soon. At bottom the problems of evolution are problems in chemical development. Zoologists are in no way schooled in the science.

As Curator of the Zoo, Dr. Huxley has a great opportunity to make animals known to the public and so save them as long as possible from extinction. Far greater service is to be done by keeping animals in existence than in worrying about how they came to be.

Mapping our Empire

The address on Geography is in advocacy of mapping our Colonial Empire—an interesting essay, with no particular application at a place like Blackpool. The occasion is but used to advance work of special interest to the writer. A full discussion of mapping would be of value at the moment. Everyone who motors knows how to use (or misuse) a road map to-day. The most interesting of our maps is that of the Geological Survey—a copy of the key map should be in every classroom of every school and hang in homes as an object of beauty. This, however, does not carry us very far. We most urgently need a soil map that can be used in laying out our islands for the organised development of the farming industry that is foreshadowed for the near future, when England learns that her first line of defence cannot be other than that of agriculture.

The address is disfigured by a careless introduction of jargons current in other disciplines. We are not helped by being told that geography is both the debtor and the catalyst of other branches of knowledge; still less by the statement that mapping is one of the vitamins necessary to the growth of the body politic. Such use of the words does not show learning; if at all they are to be used with specific meaning: to catalyst no specific meaning is attached; it is just thrown in, to avoid explanation, as a rule: if you don't know what is happening you dub a change catalytic.

The address in Physiology is a breezy essay on the control of the circulation of the blood, admirable in its brevity (pp. 8). No playing to the gallery. The author implies, frankly enough, that the subject is beyond us at present, so great is the complexity and difficulty of the problems.

The Position of Psychology

That in Psychology is equally brief, but is mere verbiage at that. The author summarises his position by saying:

"Now to summarise briefly the thread of the discussion. The subject matter of psychology is taken to be the activities of the individual organism striving to maintain its full integrity in the universe in which it lives. To obtain control it must organise the presented material of experience into patterns manageable by it, and to this end it develops skill in its activities. Naming these skills by a word not inconvenienced by over much usage, we have called them schemata, and the system of a person's schemata embodies all his experience up to the present moment and determines the direction of his future experiencing. The patterns of experience are formed by them, though not independently of objective conditions. Thus, in outline, the 'ways of seeing' and the 'ways of living'—whether socially or otherwise—are reducible to a common psychological genus."

Anything less suited to Blackpool could not well be imagined. It is true the language of modern physics is almost equally elusive, but it has something to go upon—psychology is pure assumption. The subject is not ripe for inclusion among branches of natural knowledge.

The botanists were fed on mushrooms, but the meal was drawn out to inordinate length and very poorly cooked. At the outset, we learn that, on finding he was expected to deal

with Mycology, the President chose a subject which seemed to fit in with the Council's suggestion, that some aspect of science should be treated which had a bearing on the life of the community. What has not? This is sufficient proof of the small attention the Council's suggestions have received, and of the simplicity of outlook of our teachers. The address is informative, but far too discursive, suitable tor an article in Thorpe's Dictionary of Chemistry but not for delivery at a meeting. Obviously, Mycologists have no imagination. A real picture of the way in which the infinitely little affects us would have been worth drawing.

We came to Agriculture—the Cinderella of the Association. It should be in the highest place. The address is devoted mainly to Russian Soil Science, so-called—at present a science of names, with no reference to cultivated soils. It may rejoice Russian ears to have soils classed as *Ektodynamomorphic* and *Endodynamomorphic* but *Muck* and the like will long remain good enough for our farming use. The science is mainly an attempt to provide occupation for a new bureaucracy of bench workers. Mr. Elliot is now arranging joy riding facilities about the world for the body.

Soil science has nothing to do with the growth of plants, an all but neglected study by research workers the world over. The plant is the only possible student of the soil but is last to be thought of, except in horticulture. There must be a day of reckoning soon—get back to our Land we must—we don't need any Russian stones.

The British Association Proceedings to-day are like the German Professor's Jubilee volume—a jumble of disconnected essays, mainly in self-glorification of their authors. The meeting should be an organic whole—the physician has to cure himself before he can help the public.

Awards to Two Outstanding Chemists

Medals for Dr. W. S. Landis and Mr. T. Midgley

AWARD of medals to two outstanding American chemists is announced by the American Section of the Society of Chemical Industry. The Chemical Industry Medal for 1936 goes to Dr. Walter S. Landis, vice-president of the American Cyanamid Co., New York, "for valuable application of research to the chemistry and economics of the fertiliser industries." Mr. Thomas Midgley, jr., vice-president of the Ethyl Gasoline Corporation, New York, and of Kinetic Chemicals, Inc., Detroit, wins the William H. Perkin Medal for 1937 "for distinguished work in applied chemistry, including the development of antiknock motor fuels and safe refrigerants."

Dr. Landis was a pioneer in the application of chemistry to the production of concentrated fertilisers. He has played an important role in that industry for thirty years. He was probably the first to produce argon in large commercial quantities. Mr. Midgley's work resulted in the creation of the ethyl gasoline industry with all that this implies—use of higher compression engines, greater flexibility of automobile operation and other advances. Mr. Midgley's more recent discovery of non-toxic refrigerants promises to be equally fundamental in refrigeration and air conditioning.

Nitrogen Production Problems

Contributing essentially to engineering and development progress in the fertiliser industry, Dr. Landis has successfully attacked production problems dealing with nitrogen, cyanamid, cyanide, ammonia from cyanamid, and nitric acid. Before the war he directed a study of phosphate which led to "the first commercial attempt at producing a highly concentrated plant food containing two essential fertiliser ingredients, ammonia and phosphoric acid." He accomplished the substitution of artificial gas for natural gas in a nitrogen-producing plant at Niagara Falls, and supervised the first large-scale production of argon.

Dr. Landis during the war period developed ammonia-producing equipment for treating cyanamid that could be built according to American standards and facilities. He brought to completion a process for making high-grade urea from cyanamid, and carried out the preliminary work for the first installation of a plant for oxidising ammonia to produce nitric acid. Another installation of Dr. Landis for converting the nitrose gases of a large nitrating plant and reconverting them to nitric acid, together with the process for oxidising ammonia, furnished the background for the ammonium nitrate plant erected at Muscle Shoals.

To meet war-time emergency he designed a portable hydrogen generator built on two motor trucks which could fill an ordinary observation balloon within one or two hours. He also set in production ferro alloys of a type not previously made in the electric furnace in the United States, and prepared a comprehensive report on nitrogen fixation which formed the basis of much of the programme afterwards developed by military committees. The production of cyanide from cyanamid and further conversion into anhydrous hydrocyanic acid occupied Dr. Landis at the close of the war. He organised and administered for several years an agricultural division devoted to the field testing and introduction of concentrated fertiliser materials. He designed an electric furnace for the smelting of complex zinc lead and copper ores, and continued the development of the wet method of treating phosphate rock to obtain phosphoric acid and gypsum.

Dr. Landis is a past president of the American Electrochemical Society, and past chairman of the New York Section of the American Chemical Society and the New York Section of the American Electrochemical Society. He is also a member of the American Institute of Chemical Engineers.

Gasoline Anti-Knock Compounds

Mr. Midgley, who will be presented with the Perkin Medal on January 8, 1937, won scientific fame as the discoverer of anti-knock compounds for use in gasoline, including tetraethyl lead, the chief ingredient of ethyl fluid. For this work he received the William H. Nichols Medal of the New York Section of the American Chemical Society in 1923. The application of certain non-toxic organic fluorides to refrigeration, forming the basis of a great portion of the air conditioning industry, was announced by Mr. Midgley in 1930 at the seventy-ninth meeting of the American Chemical Society. The refrigerating agent, a compound of carbon, chlorine and fluorine, is also non-inflammable and was found to have very desirable engineering characteristics. Mr. Midgley developed it with Dr. A. L. Henne in the Dayton, Ohio, laboratory of the Frigidaire Corporation.

The research on tetraethyl lead was done in the General Motors laboratories at Dayton, Ohio, and Detroit, Mich., with the assistance of Mr. T. A. Boyd. Three cubic centimetres of tetraethyl lead was shown to give a gallon of gasoline the same anti-knock qualities as four-tenths of a gallon of pure benzol. Its use in motor fuels, it is asserted, is responsible for the consumption of many millions of pounds of lead, chlorine, bromine, sodium and alcohol.

Mr. Midgley, whose home is in Worthington, Ohio, is chairman of the board of directors of the American Chemical Society, a fellow of the American Association for the Advancement of Science, and a member of the American Institute of Chemical Engineers.

Materials and Stores Accounting

Advantages of the Slip System

By S. HOWARD WITHEY, F.C.I.

THE internal organisation of a chemical manufacturing business, large or small, calls for the institution of accounting methods on modern lines, but the need for concentrating on production and selling necessitates that the book-keeping system should be as simple as possible to maintain, and that the maximum degree of accuracy should be guaranteed in the compilation of costs and in the tabulation of the financial position of the business. Any method, therefore, which reduces the volume of clerical work while at the same time actually increasing the general efficiency of the business or any section is worthy of consideration, especially as the general trend in the industry is in the direction of delegating more responsibility to members of the staff.

Purchases of Raw Materials

Purchases of raw materials and stores for use in production usually involve a variety of operations both in the factory and the office, and the same information is often set down on paper several times. For instance, an entry may be made in a stock order book provided with columns for showing the quantities and cost prices; another entry may be made in a materials inwards book or stock received book, while if constant stocktaking operations are to be avoided separate stock accounts will have to be kept, showing on the left-hand or debit side the quantities and values received from suppliers and purchasing agents, and on the opposite side the quantities and values issued against properly signed requisitions. These records are rarely made by the same person. Moreover, the entries made in the purchase journal have to be compared with the particulars enumerated on the invoices and other debiting documents received, and the cost prices posted to separate personal accounts opened in the bought ledger, probably by another clerk. All these postings and additions will have to be independently checked.

Many firms enter particulars of materials and stores purchased on memo sheets ruled with columns for the insertion of the dates and quantities shown on the delivery note, the number and amount rendered on the invoice, the date, number and weight as per weighbridge sheet, and the inwards number. At least a dozen separate entries are needed under the various headings from the time of placing an order to the allocation of the cost against specific jobs or operations.

By setting down all essential details on a card of original entry capable of being used through all stages of the book-keeping, all posting and duplicating can be avoided, while at the same time the possibility of errors in the records will be eliminated because the same figures will pass through to the final accounts.

No Need for Elaborate Cards

The card or slip of original entry need not be elaborate. Its size and measurements are not important, and such documents as orders, materials requisitions, labour allocation cards, and invoices can be readily converted by slotting the documents horizontally and vertically at both ends, or the forms may be attached to supporting sheets which can be priced, extended and then slotted. In this way the maximum amount of information can be presented with the minimum of office work, and providing the original figures are correct the final accounts will be accurate, there being no stage during which clerical errors can creep in. All supporting sheets can be readily filed on a visible index system of which there are various kinds in use at the present time. Visible records equipment should, of course, be handled with care, and is very suitable for inventory records, job cast records, records of employees, and for any type of record to which constant references have to be made, and as the method costs very little to set up and can be operated by junior clerks there is every likelihood of its development in the industrial field.

The slip system may be adopted by sellers of materials and stores as well as by buyers, and as far as the accountancy side of a supply business is concerned, the orders received will be of primary importance, and will form the basis for all the entries to be made in the books. The methods to be adopted for dealing with instructions and advices should therefore be constantly reviewed in the light of altered circumstances and trends of trade, and the practice sometimes resorted to, of depositing orders in a drawer, or leaving them to accumulate on a desk or counter, cannot be recommended.

Recording Orders

There are, of course, several ways of placing orders. Consequently there are different methods of recording same when they arrive. The progressive industrialist will seek to set up and maintain a really efficient method of book-keeping and control in the matter of orders, and many prefer to write out all instructions received on loose printed sheets. Until such time as the goods or articles have actually been supplied these sheets may be retained in a folder or on a file, but are eventually bound together to constitute a kind of order book and sales book combined. Care should be exercised, however, to ensure that none of the sheets are mislaid or filed away before the orders have been properly fulfilled, or before the full selling prices have been charged against the customer.

Some firms have supplemented the slip system by the use of a duplicate book, or manifold order book. Others rely entirely on the efficiency of the carbon-copy method, the orders being made out on thin tissue leaves, either by pen or pencil, one sheet being reserved for each distinct order. When a duplicate book is in use, each original form should be removed and handed to the person or transferred to the department which is immediately interested in the fulfilment of the particular order, the carbon copy being preserved intact in the book where it is always available for purposes of reference.

If more than one authentic copy is considered necessary or desirable, one can usually be passed on to the office or accounts department. In some works, orders are frequently taken by one department for another department. These should be given over without delay for entry into a rough order book from which sheets may be made out for transfer to the despatch room. Later on, the invoices will be made out and forwarded to the customers, and in order to avoid three writings for one order it may be much more convenient to use two or more invoice books, comprising, say, a white original, a yellow duplicate, and a pink triplicate. The originals may be suitably printed, but the copies can be plain sheets, and when a sufficient number of orders have been obtained the book may be sent to the despatch department while another invoice book is being entered up.

Use of Loose Leaf Ledgers

There are many disadvantages associated with the use of bound ledgers of the ordinary type, particularly as regards space for the opening of individual accounts. In order to avoid the constant transfer of accounts from one part of the ledger to another, perpetual ledgers should be used, consisting of loose sheets or cards. If the sheets are used the accounts can be opened either in alphabetical or numerical sequence, indeed the system allows a combination of the two,

the sheets being bound in a book file. If cards are preferred, they should be kept in a drawer where they can easily be maintained in position by means of a steel rod or other similar device. The principal advantages of such an arrangement lies in the fact that the opening of new accounts is avoided, while each account will always have the same position and there are no blank sheets or cards to turn over. Only current accounts are handled. there being a separate division of the ledger for "closed accounts."

Experience has proved beyond doubt that perpetual ledgers facilitate the rendering of monthly statements of account and enable the details enumerated on all debiting documents to be readily verified. Preparations for the periodical audit of the books and accounts are also greatly facilitated by their use.

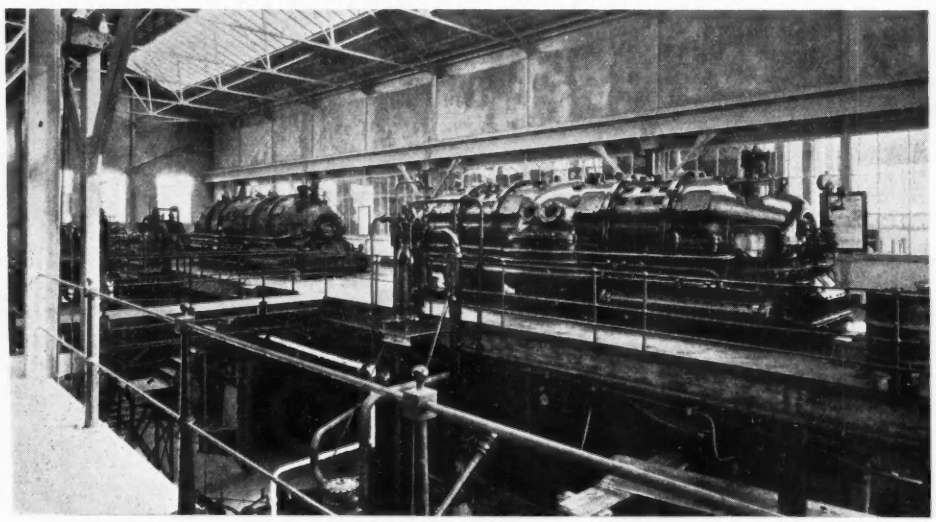
Enterprise in the China Clay Industry

A New Power Station Opened in Cornwall

A NEW epoch in the history of the West Country's china clay industry, to which prosperity has returned, opened with the inauguration at Nanpean, Cornwall, by Lady Aberconway, wife of the chairman of the company, of the new £110,000 power station of the English China Clays, Lovering, Pochin and Co., Ltd. Lady Aberconway was presented with a silver casket, bearing an engraving of the station, as a souvenir of the occasion.

Describing the plant, Mr. Davies said they had put in three boilers capable of 30,000 lb. of steam per hour, one of which was spare. They had two 5,000 kilowatt generators, and one small generator to take the night load. The load would be a maximum of about 3,500 kW's, leaving 1,500 kW's to spare. It was anticipated that the 5,000 kW sets would do all the company would need for some years, and the second set would constitute 100 per cent. spare. They had had to erect about twenty miles of high tension wires and about fifty miles of low tension wires to carry the D.C. current low pressure from the substation into the works for winding and pumping. Twelve substations had been erected, and they had four or five works linked up to each. These were already in operation. Their output would eventually come up to fifteen millions. The board was satisfied that they could do it even cheaper than the grid, and it was anticipated that the new equipment would enable the company to generate electric current at a price that would enable the capital to be repaid in about ten years.

LORD ABERCONWAY, who presided at a luncheon held subsequently at the Carlyon Bay Hotel, referred to the manifold uses of china clay. He said they could read on it, and eat on it, and actually feed on it, because the commodity was introduced into more of the things they ate and of the medicines they took than was suspected. China clay was cheap; it had to be cheap, because nowadays they had a great many competitors abroad. They now had competitors in all countries where they used to have a monopoly, and they had to meet tariff walls and get round quota restrictions, and to do all that it had to be very cheap. In Cornwall, however, they had many advantages. They had the best china clay in the world, which was a great asset, and another great asset was that they were only a short way to the sea-board. They were served by a very excellent railway company, with a first-class loading port at Fowey, for which they were very grateful. They had public-spirited, sympathetic and generous landlords, and they had good men to work for them, hard workers really out to help the clay trade.



Interior of the new Power Station of English Clays, Lovering, Pochin and Co., Ltd., at Nanpean.

The Government, continued Lord Aberconway, had spent tens of millions of money on the grid, and they were told that cheap electricity was to be provided all over the country, but the reverse was the case. The company's job was to produce china clay, and not electricity. They did not want to put down a power station and spend £110,000 in producing power if they thought they could have bought it from the grid, but they made their calculations and found they could get it at less than the grid would give it to them.

Mr. W. H. GRAHAM, secretary of the British China Clay Producers' Association, observed that on the whole their industry had been well treated by its landlords, concessions being granted often when times were bad. Four thousand men were engaged in the industry, and they were a jolly good lot of fellows. He congratulated all concerned on their fine achievement and the courage that had prompted them to try and beat the grid.

Innovations in Ball Milling

Some Factors Involved in the Grinding of Ores

MANY years ago E. W. Davis assumed that the rate of wear of the different sizes of balls in a ball mill was directly proportional to the weight of each ball, and he evolved a formula from which to calculate a balanced charge. Operators have used this formula when purchasing balls for a new mill or reloading an old one that had been emptied for repair. The formula required that the largest ball size and the size to be rejected should be determined, and after that the amount of the other sizes was set. Stress was laid upon the coarsest size, and many writers have made their contribution by reporting ratio of particle size to optimum ball size to facilitate use of the formula.

The inadequacy of the formula and the futility of extensive experimentation for ratio determinations is at once obvious when one realises that the formula did not consider the grinding rate of the finer sizes, states the United States Bureau of Mines (Report of Investigations, 3306). To be sure, a few operators who were grinding to very fine sizes altered the make-up charge by using some small balls with the big ones, but this practice has been somewhat haphazard.

Insufficient Formula

To-day operators have a keener sense of the relatively large amount of work required to finish the finest sizes, so the insufficiency of the formula is readily seen. It would have been fortunate if the formula had been devised to attract more attention to the finer particles. The literature is first-class from the standpoint of ball wear, but it gives very little about a balance for the best grinding of all particle sizes extending throughout the length of the mill. Research has accepted this matter in a spirit of submission.

That the coarse particles must be crushed is not denied, else no fine material would accumulate; emphasis, however, is laid on the fact that when crushing to 200 mesh the operator should select balls for crushing, say, from 190 to 200 mesh, or when crushing to 65 mesh he should judiciously load the mill for crushing from 48 to 65 mesh. If this practice were followed the grinding would be much better, and the circulating load would be relieved of the large amount of nearly finished size. In its stead would be some coarser material from which the classifier could more easily remove the finished size.

Published tests have been supplemented by detailed information on the optimum size of balls for grinding sized ore. Figures have been obtained which show conclusively which size of ball is the most efficient in crushing certain sizes of dolomite and chert. In crushing material of the size range 48 to 65 mesh the increased efficiency of small balls has been strikingly demonstrated. As regards capacity and efficiency small balls $\frac{5}{8}$ in. in diameter were more than twice as efficient as 3 in. balls.

Comparative Tests

The old formula was therefore set aside temporarily for one that included all the sizes of particles and the size of medium that was suited for each size of particle down to the finishing size. This formula gave a ball charge that differed widely from the old ones; a great many small balls were required. Comparative grinding tests gave more effective grinding by the new charge.

The discussion about the ball charge points to making it up in accord with requirements at the finish as well as at the beginning of the grind. Should the sizes be segregated or should they be mixed? In the metallics industry they are segregated only when mills are placed in series and succeedingly smaller ball sizes are used from the first to last mill in the series. In the cement industry dividers or grids are used to divide the very long mills into sections each of which has the appropriate size of medium.

With the knowledge that the cone of a conical mill functions like a grid in segregating the balls with respect to size, conical mills were built and tested. The first one was only 3 ft. long; it proved that a steep cone is not required for grading the balls. A taper of 2 in. to the foot was ample to segregate the largest balls in the big end and the smallest balls in the small end. Grinding tests in this mill with a ball charge proportioned in accord with recent experimental results were compared with the old cylindrical mill loaded with the old-style ball charge. A decided advantage was gained by the newer practice; it resulted in 58 per cent. more grinding for a unit of power.

Advantages of New Ball Charge

To determine whether the improvement was due to the conical mill or the new ball charge or both, a larger mill was built. It was 6 ft. long and had the same taper as the first one. The big end was 2 ft. in diameter and the small end 1 ft. in diameter. The power to segregate the balls was put to the severest test; the small balls were placed in the big end and the big ones in the small end, and after a few minutes of operation their positions were reversed. Having given positive evidence of the segregating effect, the mill was ready for use.

Grinding tests with several combinations of mills and charges led to the conclusion that the advantages which had been gained were due more to the new ball charge than to the new design of mill. It was difficult to show that the conical mill had advantage over the cylindrical mill. In fact, the 6 ft. conical mill had a disadvantage; it induced the ball load to drift to the big end and pile up there to such an extent that it passed through the feed entrance into the scoop. A grid had to be placed on the feed opening to retain the charge.

Considering the large amount of work required to grind the fine sizes, it became apparent that a long, conical mill with its smallest diameter where the greatest amount of work is done is about as near to being the antithesis of a good design as anything that could be contrived. Hence, a change was made to a cylindrical mill lined with a series of truncated cones.

More Research Required

A 2 ft. × 3 ft. cylindrical mill was lined to give the conical effect, but instead of having one cone it had three truncated cones end to end and apexing in the same direction. Any cylindrical mill may be so lined by using tapered liners. If the liners are 2 ft. long, a 12 ft. mill would have six truncated cones end to end. The mill would have the same capacity at the discharge end as at the feed end. In some ways, at least, this would be an advantage over the long cone. The mill with truncated cones proved to be as good a sizing device as the long, single cone, but when compared with the old cylindrical mill its advantage as a grinder was not marked.

Finally, a grid was placed 1 ft. from the feed end of a 2 ft. × 3 ft. cylindrical mill to keep the ball sizes segregated. Balls $2\frac{1}{2}$ to 1 in. in diameter were placed in the feed-end section and $\frac{3}{4}$ in. balls in the discharge end. The grinding was scarcely better than if the grid had been absent. The grind would have functioned more advantageously if the feed had been coarser and the finishing finer.

The results obtained with the conical mills and with the cylindrical mill containing a grid show the difficulty of finding a substitute for the plain cylindrical mill. The validity of graded sizes of balls to grind the ore in steps cannot be denied, but more research is required. Ample provisions must be made for a circulating load in each step.

In the conical mills or in the grid mill as used in these

tests the rate of feed could not be properly set. If the feed were a little too fast some of the coarse particles would pass the zone intended to grind them and would likely continue without being ground. Again, if the feed were too slow energy would be wasted by making the fine particles remain too long with the coarse medium; overgrinding and inefficiency would result. The new ball charge showed about the same superiority in the plain cylindrical mill as in the others.

As a means of increasing efficiency other modifications of the ball mill have been suggested. For example, to obtain greater impact a designer of grinding equipment conceived the idea of placing a cylindrical drum in the ball mill with its axis coincident with the axis of the mill. Each of three drums have been tried in a 2 ft. × 3 ft. mill; they were $8\frac{3}{4}$, 11 and $12\frac{1}{2}$ in. diameter. According to the statements of the inventor the balls are thrown from the top of the drum and meet the heap below by impact. Doubtless the grinding is by impact as claimed, but a thorough examination shows that at different speeds with drums of various sizes and with various ball loads the products from the grinds are quite similar to those made without the drum. The ultimate effect of the drum was to reduce the required power, and the loss in grinding was proportional. Hence, the drum reduces capacity without increasing efficiency.

The discussion thus far relates to wet grinding. Recently, however, a study of dry grinding has been made; the tests showed that with the same amount of ore in the mill and at the same speed the *capacity* of the mill grinding wet is about 20 per cent. higher than when grinding dry. The grinding *efficiency* of the wet charge also is about 20 per cent. higher than the dry charge with ore loads proportional to those usually found in practice. Screen analyses of dry-ground and wet-ground products having the same percentage of minus 200 mesh material were examined to see which method gave the best selective grinding. Selective grinding was found to depend on the fixed and induced variables.

Mixing Operations in Interchangeable Containers

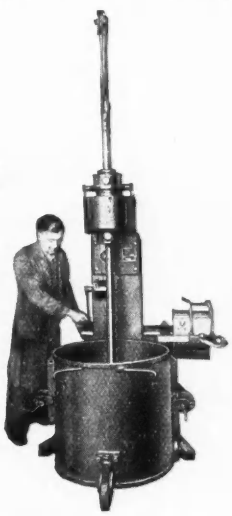
A Practice Which Should be More Widely Adopted

SPEED has now entered into most things and the chemical and paint manufacturer who requires to mix pigment with media is beset with many problems previous to obtaining efficient mixing.

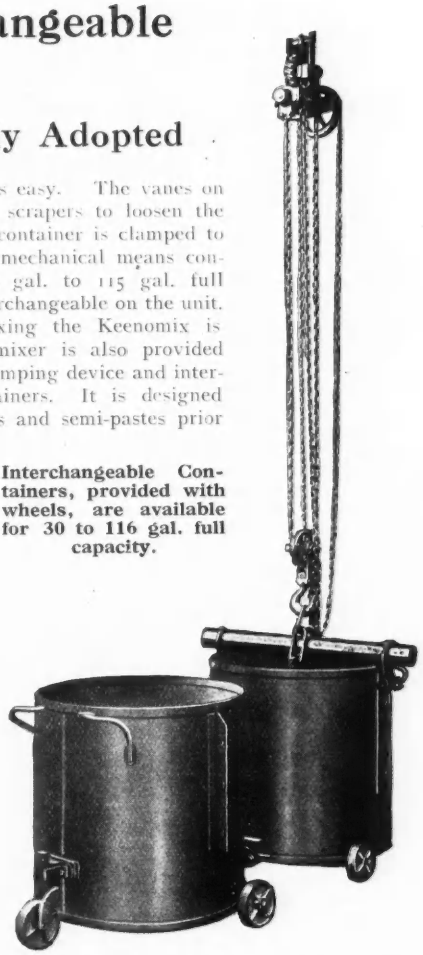
The Keenok Co., Ltd., who for many years have been engaged in producing plant to obtain perfect mixing results for the chocolate and confectionery trades, in addition to the paint and allied trades, have during the past two years produced two mixers for separate purposes. The Keenowhirl light duty mixer has a wide utility field. It can handle products such as oil paints, varnish paints, enamels, synthetic cellulose enamels, photogravure news inks, poster inks, oil-bound water paints, leather dressings, thin pastes, ointments, etc. It can be supplied with whirls of either 28 or 34 inch diameter, revolving at 250 r.p.m., which work efficiently either lowering by gravity into the container or by fixing a definite position, according to the consistency to be mixed. The rotary unit performs the mixing action and works without the need of a stationary baffle unit. The vanes apply movements downwards, upwards and outwards, creating a strong circulation of the loosened material into the whirled medium. A very rapid mixing action takes place under the intensive influence of the whirl unit and the handling of materials becomes easy. The vanes on the whirl act as scrapers to loosen the material. The container is clamped to the unit and by mechanical means containers, from 30 gal. to 115 gal. full measure, are interchangeable on the unit.

For heavy mixing the Keenomix is available; this mixer is also provided with a special clamping device and interchangeable containers. It is designed for mixing pastes and semi-pastes prior to grinding through machines of all types. There are two mixing actions—the rotary head revolving quite separately from the mixing blades of which three to six blades can be used, according to the consistency of materials. It is capable of mixing 5 cwt. of heavy material at one mixing. A scraping blade is attached to the rotary head, resulting in a complete and even mix in the container. A notable feature is the automatic lifting and lowering into the container. Cleaning of the machine takes only two minutes. The use of a clutch cuts out the blade movement from the rotary head when materials do not demand "waltzing action," therefore using less power.

Left—The "Keenomix" Heavy Duty Mixer.



Right—The "Keenowhirl" Light Duty Mixer.



Interchangeable Containers, provided with wheels, are available for 30 to 116 gal. full capacity.

Development of Leather Cloth Manufacture

Post-War Rationalisation

MR. P. MARTIN, chairman of the Leather Cloth Group of Imperial Chemical Industries, Ltd., gives a short history of the leather cloth industry and a note on the stages which led to the concentration of all the group's activities at its present factory at Hyde, in the September issue of the "I.C.I. Magazine." So far as can be ascertained, he writes, it was between 1840 and 1850 that the first serious attempts were made to utilise nitrocellulose compositions for leather cloth production, and many and varied vicissitudes were experienced before the first leather cloth company was incorporated in this country. The original company was Pegamoid, Ltd., which was registered in 1895, and it was undoubtedly the products of this concern which caused the name "Pegamoid" ultimately to become a generic term for all types of leather cloth; in fact, the word is still found in most dictionaries followed by some such definition as "an imitation leather."

A few years later, namely in 1899, the British Pluviusin Co., Ltd., was incorporated to manufacture artificial leather according to German-Austrian methods, and the Monton factory, which was then erected, was modelled on the then existing works at Dresden and Vienna. On October 5, in the same year, the British Leather Cloth Manufacturing Co., Ltd., was registered, and thus it was at this period that the manufacture of leather cloth became really established as a considerable industry in this country.

Rexine, Ltd., was incorporated in 1915 in order to protect the trade mark "Rexine," and also to act as the selling company for all the products of the British Leather Cloth Manufacturing Co., Ltd. Nobel Industries, Ltd., acquired the British Pluviusin Co., Ltd., in 1919; New Pegamoid, Ltd., in 1924; and the British Leather Cloth Manufacturing Co., Ltd. (including Rexine, Ltd.) in 1925. Subsequently, Levvarex, Ltd., of Hainault, Essex, and Ceymal, Ltd., of Croydon, were also absorbed.

The rationalisation of the industry was begun by closing down the New Pegamoid factory at Edmonton and transferring manufacture to Monton. Later the Levvarex and Ceymal businesses were transferred to Hyde, and, subsequently, in 1931 the Monton factory was closed down, the manufacture being thereby concentrated at Hyde. To complete the undertaking new offices were built at Hyde, and the entire administration and selling staff concentrated there in April, 1932.

At Hyde the group had an already established factory, and the main problem was to extend it in the most economical fashion, from the point of view of efficiency, both to provide the additional output required as the result of closing down the other factories and to meet the increasing demands resulting from further developments. Considerable extensions and alterations, particularly in the form of modernisation of plant, have been gradually carried out over the past few years and, at the present time, the capacity is approximately four times what it was when the factory was taken over. Still further extensions are now in progress. In addition, the works and offices have been entirely re-organised, and it is considered that in I.C.I. (Rexine), Ltd., I.C.I. now possesses the premier nitrocellulose leather cloth business in the world.

When it is known that there are over eighty different qualities of base-cloth, almost all of which call for embossing with each of 110 designs or grains, and that each quality and design has to be produced in every conceivable colour and shade of colour, running into many thousands, it will be appreciated that the various combinations of base-cloth, design and colour demanded are almost limitless. There are also the processes of colour matching, embossing, and finishing, which, though to the inexpert look straightforward and simple, demand special skill and care, and can only be carried out by operatives of long and proved experience. Further, some of the higher-grade finishes cannot be satisfactorily obtained mechanically, and in these cases only the craftsman's skill can produce the desired effects.

Having defined the duties of the group chairman, managing director, sales staff and secretariat, Mr. Martin explains that research is controlled in the main by a body consisting of the managing director, the sales director, the works manager, assistant works manager, chief chemist and assistant chief chemist, which meets once a month and, *inter alia*, reviews all research programmes and development work.

Having found from experience that time at board meetings seldom permitted a detailed review of all factory problems, it was decided a few years ago to set up a body, advisory to the delegate board, which, for lack of a better name, was called the factory sub-committee. This body is composed of the chairman, the managing director, and the technical director, and the works manager, and sometimes the works engineer, attend its deliberations, which are held immediately prior to each delegate board meeting. All the advantages originally anticipated from these meetings have been more than realised.

A Promising Field for Synthetic Resins

By "CHEMITEX"

IT is only comparatively recently that resin-impregnated fabrics for wearing purposes have come into use. Textile materials for furnishings which have been *coated* with resin, varnish, nitrocellulose dopes, rubber, have been known for many years, but they obviously belong to an entirely different class from the new anti-crease rayon ties, dress materials and such light goods. Fabrics of the latter kind must obviously be made by different methods and the choice of suitable resinous material is a matter of considerable complexity, since the finished fabric should be free from colour, and any suggestion of brittleness or tackiness, whilst the finish obtained must be fast to washing, soaping and perhaps even ironing. All these qualities must be considered also in connection with oxidation and light-exposure; a stable resin material is very desirable, yet by reason of the exceptional "spread" and the large surface which a fibrous material offers, this question is not easily dealt with.

Much of the early experimental work and the first patents were recorded by Tootal, Broadhurst and Lee, Ltd., but since 1932, when the first public announcements were made, many other important textile manufacturers have shown their interest and belief in resin-fabrics by taking out patents. Those who care to consult the foundation specifications of the above firm should see Brit. Pat. 291473, 291474 and 304900. Condensations of the urea-formaldehyde type are the most usual in textile work and by double impregnation of the goods in urea and then in formaldehyde solution, or by subjecting to the vapours of the same, fixation of the resin is achieved. The amount of resin deposited is usually of the order of 15 per cent., larger amounts affect the durability of the fabric.

It is found that the phenol-formaldehyde resins do not fulfil the requirements for freedom from colour and resistance to alkaline liquors as do the urea condensates.

An elastic anti-crease finish is produced by condensing formaldehyde with ammonium sulphide or sulphocyanide, according to Brit. Pat. 424535, and these are stated to be quite different from the urea resins. For textile purposes it is convenient to make an aqueous solution of the resin in a preliminary stage of the condensation when the substance is water soluble. Thus cotton or viscose rayon is impregnated with a solution consisting of 900 parts of 30 per cent. formaldehyde, 300 parts urea, 150 parts 30 per cent. ammonium sulphide, 70 parts ammonium sulphocyanide, and 900 parts water. The fabric is then mangled or hydro-extracted to remove excess of solution and then the resin is formed by running it over heated rollers at a temperature of 130° C. The advantageous features of this process lie in the fact that in the condensation a much lower temperature is employed than is necessary in the case of a simple urea-formaldehyde type of resin, tending less towards fibre deterioration, and also in the elasticity of the finished fabric.

Still lower temperatures of insolubilisation are achieved in Brit. Pat. 437642 (Calico Printers' Association). For example, a viscose rayon fabric is dyed with Diamine Rose FFB and impregnated with a solution made by dissolving 5 parts by weight of salicylic acid, 10 parts urea and making up to a volume of 100 parts. The material is dried and treated to the vapour of boiling 15 per cent. formalin solution for 20 minutes. Here the temperature is of the order of 100° C. and comparatively safe for even delicate fibres.

The use of synthetic resins in textile finishing is not confined to the production of anti-crease finishes only, other interesting and novel results may be obtained by their aid, all of which indicate the great possibilities in this field. Thus Brit. Pat. 437361 (Tootal, Broadhurst and Lee) draws attention to a factor which was previously a disadvantage of resin-treated fabric, namely, their loss of strength and durability on acquiring crease-resistant powers and then describes a modified process to rectify this defect.

The application of resins to textiles may also have significance to the dyer. Brit. Pat. 433210 describes how cotton may be made to have affinity for acid and basic dyes (their cost is low), by deposition of a urea derivative condensation product; the same point is dealt with in Brit. Pat. 433143, both granted to the Society of Chemical Industry in Basle. Other useful features of synthetic resins in fabric are indicated by Brit. Pat. 442585, which deals with a process for weighting rayon with urea-formaldehyde, and also by Brit. Pat. 435868, which claims that dyed goods aftertreated with resins are faster to washing.

British Tariff Policy

Views of the Federation of British Industries

IN February, 1934, the Federation of British Industries issued a statement regarding the principles on which it considered British commercial policy should be based. The Federation has now presented further observations as the result of experience gained in the intervening period. A copy of the report has been sent to Mr. Runciman, President of the Board of Trade, by Lord Hirst, president of the Federation. The main recommendations are: (1) The imposition of quotas to overcome certain dangers arising from the economic policy of foreign countries which cannot be met by our present tariff machinery; (2) protection against the importation of Empire manufactured goods; (3) that more advantage should be taken of the fact that the United Kingdom is the leading importing market in the world; (4) the withdrawal of most-favoured-nation treatment from countries who continue to give unfavourable treatment to Britsh goods—this to be accomplished by the adoption of a three-column tariff; (5) a full implementation of the Ottawa Agreements; (6) in foreign negotiations the criterion for assessing the balance of domestic produce and manufactures only.

The Import Duties Act has, in the main, been successful in assuring a reasonable level of protection to efficient industries without detriment to consuming interests. There are certain dangers, which may become more serious and which may imperil our protective system. They are: (a) The subsidising by foreign countries of their exports, and other forms of uneconomic competition; (b) the depreciation of foreign currencies; and (c) competition from foreign countries with standards of living so low as to render competition from the United Kingdom impossible.

The Federation considers that the most efficacious way to meet these dangers would be the addition to our tariff machinery of powers to impose quotas. In order to allow of this being done the Anglo-German trade agreement should be re-negotiated with a view to eliminating Article X.

With regard to the Empire the Federation urges that, in order to avoid undue competition in manufactured goods arising in the home market from any part of the Empire, the Government should take powers to enable it to afford protection to United Kingdom manufacturers, if and when the exercise of such powers should prove necessary.

It is urged that, since the United Kingdom is the leading importing market in the world, full advantage of this fact should be taken in order to induce foreign countries to give reasonable opportunities to British exporters. There are three particular ways in which the economic policies of foreign countries act to the detriment of the British exporter—(a) discrimination against United Kingdom products; (b) exchange control; and (c) unfavourable treatment of British goods without actual discrimination. Powers already exist to deal with points (a) and (b). The Federation urges that these powers should be used whenever necessary. With regard to (c) the Federation has constantly pressed for the withdrawal of most-favoured-nation treatment from countries which behave in this manner. Under present conditions, however, this would entail separate legislation for each offending country. The Federation, therefore, considers that the Government should restrict the benefits of most-favoured-nation treatment to those countries which have entered into a commercial agreement satisfactory to the United Kingdom. The Federation suggests the following procedure to permit of this being done: (a) that existing British tariff duties, subject to any modifications recommended by the Import Duties Advisory Committee, should be applied only to foreign countries with which the United Kingdom has a most-favoured-nation agreement; (b) that a higher scale of duties than those under the normal British tariff should be created, such duties to be automatically applicable to any country which does not enjoy most-favoured-nation treatment.

The higher rate of duty could be achieved by the institution of a three-column tariff, the top column of which would apply automatically to those countries not enjoying most-favoured-nation treatment.

With regard to the Empire, the Federation is of the opinion that since the Ottawa agreements were concluded in 1932, other Empire countries have obtained benefits greater than has Great Britain. In order that United Kingdom industry should be assured of results equally satisfactory with other parties to the agreements, the Federation is convinced that the full implementation of the guarantee given by Oversea Dominions to British Industry in the Ottawa agreements must be maintained.

New Technical Books

FLOTATION. (Schwimmaufbereitung.) Reports on Scientific Research, Vol. 36. By W. Petersen. Dresden and Leipzig: Theodor Steinkopff.

This book is intended to fulfil two purposes: to serve the flotation expert, and to endeavour to give the ordinary technician, the engineer, the scientific man and the chemist a general survey of the development, importance and application of flotation. It does both very well. The development of flotation has received great impulse through scientific knowledge and research. The study of adsorption processes has helped the application of chemical means of flotation. For that reason the colloid chemical influences on flotation are dealt with very thoroughly. The book has a double interest as regards the broad general importance of colloid chemical processes and their growing interest for the chemist. It gives such an excellent survey of the development and the present position of flotation, and points out certain prospects in the future. It also contains valuable tables and a bibliography of 856 references.

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DECHEMA ENGINEERING MATERIALS REPORTS. (Dechema Werkstoff-blätter.) By Dr. E Rabaid. Berlin: Verlag Chemie, G.m.b.H.

This is a collection of references to engineering material questions in chemical technique from literature at home and abroad. Actually these are "short references," but when one considers that on 105 large pages over 4,000 publications are reviewed one can estimate the enormous field of work which is covered. It must be realised that the references give one in the shortest form not only the title but also an idea of the contents of each work. The fact that the German language has made up its own technical term, "werkstoff," for the more complicated expression "engineering material," shows the very great interest which the Germans have—and have had for a long time—for all questions and problems connected with engineering in its widest sense. The unusually great importance of these questions for every technical progress is unfortunately not yet appreciated in England in the same way, although interest is increasing continually. For this reason these German reports will have some significance.

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HARD-METAL TOOLS, THEIR WORKING PROPERTIES, TREATMENT, CONSTRUCTION AND APPLICATION. (Hartmetallwerkzeuge, Wirkungsweise, Behandlung, Konstruktion und Anwendung). By Dr.-Ing. Karl Becker. Berlin: Verlag Chemie G.m.b.H.

The author of this interesting monograph published, about three years ago, another monograph on "High-Melting Hard Materials," describing the general views of manufacture and the chemical and physical properties of these most interesting engineering materials. This book of Becker's is for the hard metal tool user. There are principles summarised for the finishing of tools and their treatment. As the users of hard metal tools are not only all metal working industries, but also the electro, ceramic and glass industries as well as the mining and wire-drawing manufacturers, the book can claim the general interest of all engineers. A few figures will show this: at the end of the year 1934 the hard metal production in Germany amounted to over 45,000 lb. per year; in 1935 it was estimated at about 90,000 lb. Becker's book emphasises the far-reaching independence of Germany with regard to the necessary raw materials. He only discusses German hard metals, and bases this point on the statement that "the German hard metal production and manufacture of hard metal tools is so much in advance regarding quality that there is not the slightest need for foreign hard metals. On the contrary all hard metals manufactured and in use abroad are, in so far as they are not of German origin, only copies of German inventions, which in many cases are inferior, in some are equal, but in no case are they superior to the German products."

WASTE PRODUCTS OF THE INORGANIC CHEMICAL INDUSTRY AND THEIR USES. (Abfallstoffe der Anorganisch-Chemischen-Industrie und ihre Verwertung.) By Emil J. Fischer. Reports on Technical Progress, edited by Professor Dr. B. Rassow, Leipzig. Vol. 36. Dresden and Leipzig: Theodor Steinkopff.

This interesting little book is built up on German experience during the Great War when a systematically carried-out science and economy of waste product uses was of vital importance to a country cut off from raw material supplies. In the raw material situation to-day in Germany the author's emphatic statement is comprehensible: "The rational use of the waste products which are so often present in very large quantities in industry is to-day of the greatest importance for rational raw material economics in every country." Although the provision of British raw materials cannot be compared with the German scarcity (in Great Britain there rather exist quite different problems) the question of the use of waste products presents great interest. It is rather a question of making saleable products from valueless materials which cost money to remove. One of the most interesting tasks in England, the removal and utilisation of a specially troublesome waste product, is not mentioned. Nevertheless it is interesting, for it gives an abundance of suggestions which could also be adapted in England to "local conditions."

* * *

TRATTATO DI CHIMICA ANALITICA APPLICA. By Professor Dr. G. Vittorio Villavecchia and numerous collaborators. Third (enlarged) edition. Milan: Ulrich Hoepli. Vol. 1. Pp. 916. 85 lire (stiff paper covers).

Villavecchia's "Analytical Chemistry" is now firmly established among the standard chemical works of this century. First published in 1916, the merit of the work received world-wide recognition by the signal compliment of translation into English, French and German. Few libraries of chemical institutes in this country will be without T. H. Pope's translation of both Volumes I and II. We now have before us the first and impressively large volume of the third Italian edition, enlarged to deal with the analytical needs of several new industries and to amplify earlier methods in the light of more recent investigations. There are now 11 chapters in the first volume (as against 10 in the previous edition) the headings of which are given here for the benefit of those chemists who have not been in the habit of consulting the English edition of 1918: Water, chemical products (in alphabetical order from aluminium acetate to zolfo), fertilisers, pesticides and insecticides, cementitious materials, mineral pigments, metals and alloys, fuels, coal tar products, mineral oils and their derivatives, explosives. The general scheme of the work thus does not depart from that of the previous edition, the most important changes being the addition of the last chapter on explosives and the allocation of a separate chapter to pesticides and insecticides. The table of contents is described as a "systematic index," there being no index in the usually accepted sense, and it is surprisingly easy to locate the desired information on the analytical method relating to any given substance once the reader is familiar with the scope of each chapter. In the chapter on pigments, the march of time is chiefly evidenced by the sections on titanium white and cadmium yellow, although zinc chromate has been apparently omited in spite of its growing importance in anti-rusting compositions. We are somewhat surprised at the omission of tellurium lead from the chapter on alloys, of the silico-fluorides and rotenone from that on pesticides, and of pentærythritol derivatives from that on explosives. Phthalic acid and phthalates are also in sufficiently common application for a variety of purposes to warrant inclusion in Chapter II. Notwithstanding these few gaps, however, the first volume of the new Villavecchia has undoubtedly kept pace in most aspects with the expansion of the chemical and allied industries.

Letters to the Editor

"Washing the Boss's Dog"—A Reply to "External Graduate"

SIR,—Many years ago, an engineer—not a chemical engineer—taunted me, a chemist, with what he called the undoubted fact that no chemist was fit to assume managerial duties because he was so immersed in his test-tubes that he was out of touch with workmen, with human problems and with realities. I indignantly denied this charge, pointing to many chemists who have made good in the higher walks of industrial life. The letter from "External Graduate," published in your issue of October 3, would have delighted my engineering friend, for it provides within itself adequate proof of his contention.

A man is not made a manager because he is a good analyst; that is no qualification whatever for such a post. I am not even sure that high technical ability is necessarily a primary qualification, for I have known brilliant administrators who had to rely for technical advice upon their staff; that may be what the staff is there for. Not for one instant would I, or any other chemist, defend a system that allots posts to those whose only qualification is possession of a banking account, relationship with a director, or even a certain type of education. Nevertheless, one is bound to recognise that the functions of the management are to keep all the complicated parts of an industrial concern moving steadily, and in unison one with another. Tact, driving power and ability to organise are of infinitely greater value than the facility to make an accurate analysis, or knowledge of the structure of complex organic molecules. Even the head of a research department, though he must obviously have a wide knowledge of science in many branches—not only in chemistry, must have something more than this; that "something more" has been set forth in your own leading articles upon many occasions.

It is evident that "External Graduate" has got himself into a very distressing condition of self-pity. He has become blind to the fact that his qualifications are not such as will induce his board to promote him. This lack of qualification is probably not in the direction of technical skill and knowledge, but it may lie in quite other directions.

For the benefit of "E.G." and others like him, let me relate an experience of my own. Many years ago one of my duties as "chemist" was to write certain technical matter for the Press. I was very pleased with what I had written; the boss was so little pleased that he said brutally that he regretted having employed me. (It will be observed that my value as a chemist was, in his eyes, completely masked by my supposed value as a writer). In some disturbance of mind I took my troubles to the professor of English at the local university. One of his men put me through the mill of English style, with the result that my writing changed out of all recognition and has later not been called in question. That is what I recommend "E.G." to do—though in other directions. The cream of the joke, which also has its moral, is that my revised style, even when "corrected" by my English tutor, did not commend itself to the boss any more than did my untutored style. The fact was, of course, that it was a case of the blind leading the blind, and the only solution was for me to find another job with someone who would "know chalk from cheese." This I did, and this, too, I recommend to "External Graduate" if he cannot get satisfaction after he has put his own house in order.

"External Graduate's" fourth paragraph is an essay in defeatism and do-nothingism. That he has taken the external degree is evidence of ability and spirit. Has he lost those qualities?—Yours faithfully,

DOCTOR OF SCIENCE.

Plastics and Scientific Instruments

A Reply from Mr. H. W. Rowell

EDITORIAL reference was made in THE CHEMICAL AGE of September 26 (page 262) to a plea for the more intelligent use of plastics in scientific instruments, made in an article by Mr. H. W. Rowell in the "Journal of Scientific Instruments." We conclude our comment by asking whether the user of the instruments would gain any advantage from the extended use of plastics: "The cost of precision instruments is not conditioned by the materials of construction," we said, "but by the care that must be taken to secure costs?" Mr. Rowell has been good enough to reply as follows:

The user of an instrument certainly does get something better when plastics are incorporated in the design in the right way, even if it is only as a substitute for a metal cover or other subsidiary part. An expensive instrument is expected to have an expensive appearance and to give service for a long time. In a chemical works or laboratory the lacquer and metal soon show signs of fatigue, and metal to metal joints may even rust together. A moulded component retains its appearance and original properties.

The gear wheel in the electric clock mechanism illustrated in the article is designed to give the user silence in operation, which cannot be obtained with metal without much more expensive design and craftsmanship. The accuracy of the wheel teeth is the same as with metal and its wear usually better. The thermometer holder illustrated, used for taking the temperature of bakers' dough during proving, not only prevents breakage but gives more accurate temperature readings in the hands of a baker than were obtained with the previous metal holder of similar shape. A narrow range of temperature must be maintained and the metal flange either absorbed from or radiated to the atmosphere sufficient heat to make the thermometer reading inaccurate.

The piece of synthetic material attached by a rivet and lug to the spring and contact stud in the ignition fitting illustrated, acts as a bearing at the large hole, as a high tension insulator and also as rubbing contact with its tip on the cam which lifts the contact stud for make and break. This component makes millions of movements per mile and is the only electrical insulating material which will stand the mechanical wear and tear for the demanded 50,000 mile rating. It makes possible the mass production of a simple, reliable component at an extremely low cost.

The moulded electric meter case illustrated is more than a mere case and cover. Because it also acts as the supporting structure and accurately positions the assembly, it reduces cost of assembly and provides the user with a weather-proof and permanently good-looking instrument at less cost. It can be produced more easily and with a less number of parts than the more usual design. As the accuracy of assembly is inherent in the moulding and is not left to the assembler, it is probably a more accurate and reliable instrument of its class under these mass assembly conditions.

These examples seem to answer your questions. If intelligent use is made of plastics and the type of instrument is one which is produced in fairly large numbers, the ultimate user not only gets better appearance, lower maintenance cost and lower initial cost, but in many cases can obtain greater precision or reliability in that type of instrument.

The English Nickel Industry

Historical Record of Progress

HENRY WIGGIN AND CO., LTD., which completed in 1935 a hundred years in the nickel industry, has followed up the ceremonial celebration of that event in Birmingham by publishing a historical record of progress. The volume, which is not offered for sale, will provide the many industrial connections of the firm and the world of metallurgy in general with an interesting history of the Wiggin business in the nineteenth century, which is virtually the history of the nickel industry in England. For that reason the compilers lament the scarcity of documents left by the men who made that history.

The foreword states: "It is particularly unfortunate that no records exist of the experimental work carried out by the company during its earlier years . . . Even the barest record would be of immense technical interest if available to-day." There is compensation, however, in a fairly complete summary of the methods of refining nickel and cobalt as they were worked out and brought to success. The seal of authenticity is set for all time on the story of Charles Askin's accidental discovery of the way in which nickel and cobalt could be separated from the nickel-cobalt-arsenide ore which Brooke Evans found in the Carpathian mountains at a time when supplies of crude nickel speiss were becoming exhausted in the Potteries. Askin and White Benson, working separately, tried to precipitate the cobalt from a solution of the two metals by means of bleaching powder, a double chloride and hydrochlorite of calcium. In this Benson failed; but Askin, who had only half the bleaching powder it had been proposed to use, found that the small amount of precipitate he produced was pure sesquioxide of cobalt, free from nickel, and that the nickel was preserved in a separate green solution. The rest of his task was simple, and this procedure was adopted later in all wet refining processes having the same object.

This discovery laid the foundation of the firm's success. It gave Askin a source of supply of nickel, and effected an almost complete revolution in pottery ornamentation, by furnishing the Potteries with pure oxide of cobalt. The most exquisite tints from pale grey to deep purple became obtainable, and in the 'sixties the renowned works of Sèvres and the English potteries of Wedgwood and Copeland drew their supplies of cobalt oxide from Birmingham.

Institute of Fuel

Next Thursday's Meeting and Dinner

ON Thursday next at 2.30 p.m. Sir Philip Dawson, M.P., president-elect of the Institute of Fuel, will be installed in the presidential chair by the outgoing president, Sir John Cadman, in the lecture theatre of the Institution of Mechanical Engineers, Storey's Gate, London. The installation will be followed by the presentation of his presidential address which will, we understand, contain some outspoken comments on rail and road traction in conjunction with fuel. Members of technical societies interested in any form of fuel as applied to transport are invited.

Professor Dr.-Ing. Franz Fischer, of the Kaiser Wilhelm Institute, Mulheim-Ruhr, Germany, has been nominated by the council as the Melchett Medallist for 1936. Professor Fischer will deliver the Melchett Lecture at 3.30 p.m. In his address he will deal with some of his most recent work in the production of oil from coal.

The annual dinner, dance and cabaret will be held at the Connaught Rooms, Great Queen Street, at 6.45 p.m. for 7.15 p.m. The principal guests will be the Right Hon. Walter Runciman, Captain H. F. C. Crookshank, M.P., and Professor Dr.-Ing. Franz Fischer. The Melchett Medal will be presented to Professor Fischer by Sir Philip Dawson during the speeches immediately following the dinner.

Irish Chemical Association

Professor Dillon's Presidential Address

IN his recent presidential address at the annual meeting of the Irish Chemical Association at Dublin, Professor T. Dillon, D.Sc., of University College, Galway, Dublin, said that any Irish industry scientifically controlled outside the country was not a national industry.

How far we had to go in the matter of educating the public to an appreciation of what chemistry really signified, was well shown by the recent report of the Brennan Commission on the Civil Service. That Commission was quite clear and judicial when dealing with the ordinary Civil Service clerks; but it became vague and unsatisfactory when it came to deal with the chemists in the State Laboratory. It had before it a modest suggestion from those chemists that they deserved salaries as good as a school inspector and it knew that such chemists had to have honours degrees. In face of those facts it actually proposed a reduction in salaries. It would therefore appear that the Brennan Commission took the view that the chemist was a tradesman, just like a plumber who learned his trade, improved a little by experience and then came to a standstill for the rest of his life.

The outlook of the State on industry, continued Professor Dillon, was especially important in a country like Ireland, where circumstances compelled a considerable amount of State interference in industry, where industries were destroyed and must be recreated from the beginning. Industry could no longer be maintained by rule-of-thumb methods. It must be based on scientific principles. From the national point of view, scientific control created a situation which had deserved some attention. With the new scientifically controlled industry, on the other hand, it might happen that the product was manufactured in Ireland and financed with capital which was 51 per cent. Irish, but that the whole scientific control of the industry was outside the country. "If such things happen," declared Professor Dillon, "Ireland may soon be called 'the island of clerks and labourers.'"

The revolution that had taken place in transport during the last 25 years provided a good example; the manufacture of motor cars and of rubber tyres had been started in the country and oil refining was soon to begin. "Two of these are industries of a chemical nature, but," said Professor Dillon, "I do not know how many Irishmen, thoroughly acquainted with their scientific principles and capable of improving and developing them, are associated with these industries in any capacity. . . Until these undertakings are controlled by Irish chemists, to whom the technical processes involved are no mystery, they cannot be called national industries."

Industrial Safety

Forthcoming Manchester Conference

VISCOUNT LEVERHULME, president of the Society of Chemical Industry, is to preside at one of the sessions of the National "Safety First" Association's regional industrial conference, which is to be held at the Bleachers' Assembly Hall, Manchester, on October 27. The conference will be opened by the Lord Mayor of Manchester (Alderman T. S. Williams), and an outstanding item will be a paper contributed by Mr. W. H. Swann, H.M. Senior Electrical Inspector of Factories, on "Electrical Hazards." Other papers will be given by Colonel C. S. Lyon, of the Liverpool Salvage Corps, on "Fires," and by Mr. H. Annis, of Metropolitan-Vickers Electric Co., Ltd., on "Works Production and Safety." Sir Basil Tangye, of Birmingham, will act as a sessional chairman. A similar conference held at Sheffield last year proved highly successful and it is expected that there will again be a substantial attendance of representatives of both managements and employees. Industrial accident prevention work is being given increasing attention in the North of England.

Institute of Metals

Full Programme for the Session 1936-37

THE Institute of Metals has just issued its 8-page folder programme of the meetings of the Institute and of its local sections for the session 1936-37. Four meetings of the parent body are planned. Of these the first will be held in London on March 10 and 11, when the 29th annual general meeting will take place at the Institution of Mechanical Engineers. The annual dinner will be given at the Trocadero Restaurant between the two sessions of the annual general meeting. The annual May Lecture—the 27th of the series—has been arranged to take place on Wednesday, May 5. This date—a week before the King's Coronation—has been chosen to meet the convenience of the large number of overseas members of the Institute who are expected to be in London next year for the Coronation.

In September, Sheffield will be the scene of the 29th annual autumn meeting of the Institute, the last gathering which took place in Sheffield having been held in 1919.

The programmes of the six local sections of the Institute, and of the associated Manchester Metallurgical Society, include more than fifty lectures on metallurgical subjects, as well as works visits, film displays and a supper dance. Members of the parent body can become members of any one loral section without further payment beyond their ordinary subscription, and are eligible to attend meetings of other local sections as visitors—a privilege that gives them a very wide range of lectures. These cover such subjects as "Powder Metallurgy," "The Common Field of the Engineer and Metallurgist," "Some Impressions of Industry in the U.S.S.R.," "Metallurgy in the Automobile and Aircraft Industries," "Shipyard Metals," "Metal Spraying by the Wire Process," and "The Technical and Industrial Development in the Electro-chemical Surface Treatment of Metals."

Copies of the programme can be obtained on application to the Secretary, Mr. G. Shaw Scott, 36 Victoria Street, Westminster, S.W.1.

Pharmacy and Poisons Act

New Home Office Memoranda

THE Home Office has published a Memorandum, Poisons No. 2 (Wholesalers) (H.M. Stationery Office 6d.) which will be of information to all (other than retail shopkeepers) who, deal in poisons in one form or another. The Memorandum is divided into five main parts. Part I deals with the traders affected and the substances controlled; Part II explains the type of transaction permitted to persons who are not retail shopkeepers and the position of "agents" and "representatives"; Part III, labelling, containers, storage and transport; Part IV requirements applying solely to First Schedule substances, labelling of hydrocyanic acid, etc.; Part V manufacture of pharmaceutical preparations containing poisons; transport of certain poisons; colouring of arsenical poisons for use in agriculture or horticulture; restriction of the sale of strychnine; inspection, etc. The appendices include a tabular statement showing the substances controlled and the articles exempted.

Another Memorandum, Poisons No. 3 (Practitioners and Hospitals) (H.M. Stationery Office, 3d.) has been issued for the assistance of doctors, dentists and veterinary surgeons in ascertaining the requirements of the poisons law affecting them. The memorandum also deals with the control of poisons in hospitals, dispensaries and similar institutions.

A further Memorandum, Poisons No. 4 (Agriculture and Horticulture) (H.M. Stationery Office, 2d.) has been published for the assistance of persons engaged in agriculture and horticulture in ascertaining the channels through which, and the means by which, they can lawfully obtain the poisons which they require. The memorandum is of interest to farmers, fruit-growers, stock-breeders, poultry keepers, etc.

Cadmium Poisoning in Industry

A New Occupational Disease Anticipated

THE mystery surrounding the death after but a few days' illness of a metal founder at Väsby, near Stockholm, who had been occupied with cadmium smelting, is believed to have been solved after extensive post-mortem examination. The pathologist, Dr. Erik Karlmark, making the first examination suspected cadmium poisoning, and after microscopic observation his suspicions were confirmed. His report has aroused considerable attention, both at the Swedish Board of Health and in industrial circles, and it is now being considered whether the working of cadmium should not be placed under special regulations.

The symptoms of the man's illness indicated influenza, but as poisoning was suspected the authorities put in hand the post-mortem examination which gave the results shown above. Under the microscope the man's brain and lung tissues were found to have many minute particles of cadmium which had caused inflammation and internal bleeding. The metal cadmium is often found in association with zinc. Zinc smelters have their special illness, a fever which up to now has been difficult to explain. It is therefore suggested that this occupational disease of zinc smelters may in reality be cadmium poisoning.

In view of the world wide use of cadmium as an anti rust material, it is felt that the question raised by the Väsby metal worker's death is of international importance. Proposals are therefore being made to enlist the international organisations at Geneva for a comprehensive study of the question.

Automatic Control in Industry

A Forthcoming Conference

THE first conference of its kind on automatic control in industry, organised by the Chemical Engineering Group of the Society of Chemical Industry, is to be held at University College, October 15-16.

Papers to be read and discussed on Thursday, October 15, include:—"Electrical Control of Chemical Apparatus," by A. D. Elmsley Lauchlan, of the Cambridge Instrument Co. "Simple Forms of Automatic Regulators," by Dr. Ezer Griffiths, of the National Physical Laboratory. "The Installation Factor in Automatic Controls," by Douglas Harrison, of Negretti and Zambra. "The Application of Automatic Control to a Typical Problem in Chemical Plant," by A. Callender and A. B. Stevenson, of I.C.I. (Alkali), Ltd.

The programme for Friday, October 16, includes the following papers:—"Some Aspects of the Technical Application of Temperature Control," by B. T. Wingfield, of the Drayton Regulator and Instrument Co., Ltd. "Automatic Control for Temperature and Pressure in Chemical Industry," by W. J. A. Copeland, of the Lovick Johnson Co. "Automatic Control of Chemical Processes," by Dr. W. A. Clark, of I.C.I. (Fertiliser and Synthetic Products), Ltd. "The Influence of the Characteristics of a Plant on the Performance of an Automatic Regulator," by Dr. A. Ivanoff, of George Kent, Ltd. "Experience of the Use of Instruments as Aids to Plant Control," by B. Friskan and E. I. Lowe, of the National Smelting Co., Ltd.

A SIMPLIFIED method for determining colour in industrial processes has been invented by V. N. Kononov, of the Institute of Historical Technology, of the Soviet Academy of Material Culture. It consists of an instrument by means of which it is possible to obtain on a photographic plate the qualitative and quantitative characteristics of any coloured surface. For instance, taking a red surface, Kononov determines by means of his instrument the exact proportions of the component spectral colours, the intensity of pigmentation and the degree of purity.

Personal Notes

MR. W. P. JACKSON, chairman of the Manchester Corporation Gas Committee, was elected president of the British Commercial Gas Association for the ensuing year at the annual meeting at Bath on Monday.

MR. D. L. MANSON, proprietor of Arbroath Cleaning and Dyeing Works, Gallowdean, Arbroath, a well-known business man in the town, died on September 30 at his residence, Ardgowan, Holt Loan Road, Arbroath. He was a native of Wick, but had been resident in Arbroath for over 30 years.

LORD HERBERT SCOTT has found it necessary to resign his seat on the board of the Cellulose Acetate Silk Co., Ltd., as from September 30, owing to increased pressure of work consequent on his appointment as chairman of Rolls-Royce, Ltd.

MR. GEORGE DEWAR, who has just retired after 32 years' service with the Oakbank Oil Co., at Duddingston, has been made the recipient of a testimonial showing the esteem in which he was held by all who came in contact with him in the course of his duties. Mr. Peter Clarke made the presentation on behalf of the employees.

MR. JOHN WALLACE, of Blairhill, Coatbridge, a member of the Midlothian Chemical Co., was married on September 30 at Hillhead Parish Church, Motherwell, to Miss Helen Warnock M'Lees, youngest daughter of ex-Provost M'Lees.

DR. R. H. PICKARD, F.R.S., director of research to the British Cotton Industry Association, will deliver a lecture on "Broad Outlines of Research in the Textile Industry" at the College of Technology, Manchester, on Tuesday, October 13, at 6.30 p.m. This will be the first of a series of lectures dealing with the chemistry and physics of textiles to be delivered at the college by eminent textile technologists during the present session.

MR. A. SCHOFIELD, British Trade Commissioner at Calcutta, is at present in the United Kingdom on an official visit. Mr. Schofield will be available at the Department of Overseas Trade during the period October 15-23 for the purpose of interviewing manufacturers and merchants interested in the export of United Kingdom goods to Eastern and Southern India, Burma and Ceylon, after which he will visit a number of industrial centres in the provinces.

Chemical Notes from Foreign Sources

Lithuania

THE ERECTION OF AN INSULIN FACTORY in the near future is under consideration by the Maistas Company.

Japan

A PLANT FOR MAKING METHYL CHLORIDE has been installed by the Mitsui Kozan K.K.

MONOCHLORBENZENE WILL BE USED as the raw material for picric acid manufacture which is to be undertaken by the Nippon Soda K.K. at their works at Nikongi.

Russia

SUCCESSFUL EXPERIMENTS with a view to the production of artificial graphite from anthracite have been carried out at the Elektrough Factory at Kudinovo. With a declared ash content of only about 1 per cent. the product is claimed to be suitable for the manufacture of elements and electrodes for the accumulator industry. ("Chemische Industrie," October 3.)

Italy

EXTRACTION OF TOBACCO SEED OIL on a large scale is now being planned in influential circles. Preliminary tests have shown that the first pressing yields a golden yellow oil and the second pressing a considerably darker oil, while oil produced by extraction is reported to be even darker. For soap manufacture its incorporation to the extent of about one-fifth with coconut oil with the addition of a little tallow is recommended. It also possesses interest for the lacquer industry. Tobacco seed oil is completely fluid at 10° C.

France

THE SOCIETE INDUSTRIELLE DES HYDROCARBURES, of Paris, contemplates the construction of a carbide factory and several warehouses near Calais where several hundred workers would be employed.

OF THE 18 MILLION FRANCS ALLOCATED by the Government to the National Fuel Office for 1937, 12 million francs are to be utilised in financing further petroleum prospecting work in France and its possessions (including Tunis) and research into new processes for producing liquid fuels from various mineral raw materials.

Esthonia

THE DAIRY CO-OPERATIVE ASSOCIATIONS have expressed themselves in favour of the erection of a second artificial horn factory with a view to maintaining the price of casein.

Hungary

THE BUDAPEST MUNICIPALITY, following the example of several large German towns, has decided to erect a plant for converting sewage sludge into methane by a fermentation process.

Czechoslovakia

A SULPHURIC ACID FACTORY is being built at Kostolany, in Slovakia, by the Weissner Company (a Roumanian concern with a capital of 2 million kronen).

A CZECHOSLOVAKIAN SCIENTIST is reported to have succeeded in producing a type of rayon suitable in place of paper for printing and offering the advantages of lower cost and greater durability.

Turpentine and White Spirit

New British Standard Specifications

IN British Standard Specification No. 244 ("Turpentine and White Spirit for Paints") the British Standards Institution embodies the revised form of the two specification for turpentine Types 1 and 2 (B.S.S. Nos. 244 and 292) and that for White Spirit (B.S.S. No. 245). The grouping of these three specifications in one publication has been effected in the hope that in this form they will be more serviceable to industry.

A few important modifications have been made in the revision. In the specification for Turpentine, Type 1, the restriction to American gum spirits has been removed, and turpentine from gum spirits from other sources are now permissible. Another important amendment relates to the polymerisation test for both turpentine specifications in which the strength of acid used has been increased from 96 to 98.5 per cent., and, in addition, in the case of Turpentine, Type 2, the limit for the unpolymerisable residue has been increased from 10 to 15 per cent.

Important amendments have been made in the specification for White Spirit in regard to the copper strip test which is used for the determination of absence of sulphur compound.

From Week to Week

THE REGISTERED OFFICE of the United Indigo and Chemical Co., Ltd., is now at 20 Lord Street, Manchester, 4.

THE NOMINAL CAPITAL of Coty (England), Ltd., perfume manufacturers, etc., has been increased by the addition of £50,000 beyond the registered capital of £76,500. The additional capital is divided into 50,000 "B" ordinary shares of £1.

THE INSTITUTION OF GAS ENGINEERS has removed from 20 Grosvenor Gardens, S.W.1, to 1 Grosvenor Place, S.W.1. Telephone number: Sloane 8266. Telegraphic address: "Gasophaner, Knights-London."

THE BRITISH COLOUR COUNCIL have issued a special colour card showing eight so-called "coronation" colours. The card may be obtained by non-members of the Council at the price of one guinea per copy.

BRITISH SULPHATE OF AMMONIA FEDERATION, LTD., has changed its address to Gas Industries House, 1 Grosvenor Place, London, S.W.1. Telephone Nos.: Sloane 4554 (nine lines); Victoria 4444 (home and export orders).

THE NEW METALLURGICAL LABORATORY of the Mond Nickel Co. at Wiggin Street, Birmingham, will be opened by Lord Weir on October 21 at 2.30 p.m. The laboratory will be devoted to research on nickel and its alloys and will be one of the most up-to-date in Europe.

IN VIEW OF EXPANDING BUSINESS new city offices and showrooms have been opened by the Improved Emulsification Process Co., Ltd., suppliers of Impulsor emulsifiers. The new address is 28 Chiswell Street, E.C.1, and the new telephone number is National 6272.

THE PENSIONS PLAN of United Steel Companies, Ltd.—the largest scheme of its kind ever arranged in this country—came into operation on October 5. The plan, which provides for the retirement on pension, at the age of 65, of 15,000 employees of the company, has been arranged by the Legal and General Assurance Society.

A PROSPECTING LICENCE under the Petroleum (Production) Act, 1934, and the Petroleum (Production) Regulations, 1935, has been issued by the Board of Trade to Major C. A. Pogson and Mr. E. H. Cunningham-Craig, carrying on business in partnership as the Midlothian Petroleum Syndicate at "Wanowri," Barrowfield Drive, Hove. The licence covers approximately twelve square miles in the County of Midlothian.

THE ESCAPE OF 1,700 GALLONS OF PETROL into the town sewers, resulting in a four days' scare following an explosion and a woman's death, had a sequel at Stoke-on-Trent when Shell Mex and B.P., Ltd., of Victoria Embankment, London, were fined £10 for violating, through their servant, Norman Hall, a condition of their petroleum licence by allowing a large quantity of petroleum spirit to enter a drain communicating with a public sewer. The defendants admitted the offences and expressed regret for what had occurred.

NINETY-TWO THOUSAND TONS OF LIMESTONE was blasted at once at Buxton on October 3. This was one of the biggest explosions ever staged in the district. The blast took place at the Buxton Central quarries of I.C.I. (Lime), Limited, about two miles from the centre of the town. Preparations for this explosion had taken nearly four months. Two tunnels were bored fifty feet into the face of the quarry, there were six chambers, and ten tons of black powder was used. All surface soil was removed before the blast, and two independent circuits, with electric detonators, were used to ensure safety.

MEMBERS OF THE SOCIETY OF GLASS TECHNOLOGY have been invited to take part on October 20 and 21 in the following functions at Sheffield, arranged in connection with the coming-of-age of the Department of Glass Technology of Sheffield University. October 20. 7 p.m. Informal dinner organised by past and present staff and students of the Department at the Royal Victoria Station Hotel. October 21. 10.30 a.m. General meeting, first session. 12.30 p.m. Informal luncheon at King's Head Hotel. 2 p.m. General meeting, second session. Papers will be communicated from the department itself and research institutions abroad, devoted to the study of glass, which have been founded since the department.

THE FIRST ORDINARY JOINT MEETING of the Edinburgh and East of Scotland Sections of the Institute of Chemistry and Society of Chemical Industry will be held on Thursday, October 15, in the North British Station Hotel, Edinburgh, at 7.30 p.m. The business of the meeting will be a symposium on "The Education of the Chemist." Opening speeches, limited to 15 minutes each, will be given by Dr. D. Bain, lecturer in technical chemistry, Edinburgh University; Dr. W. G. Hiscock, works manager, Scottish Dyes, Ltd., Grangemouth; and Dr. W. P. D. Wightman, science master, Edinburgh Academy. Amongst others who hope to be present to take part in the general discussion are Mr. R. Leslie Collett, assistant secretary, Institute of Chemistry, and Dr. W. O. Kermack.

THE NOMINAL CAPITAL of Stellite, Ltd., Queens Ferry, near Chester, has been increased by the addition of £250,000, beyond the registered capital of £250,000.

ALBRIGHT AND WILSON, LTD., Clifford Christopherson and Co., Ltd., and Keith Piercy, Ltd., will change the address of their London offices as from Monday, October 12, to Shell-Mex House, Strand, W.C.2, and the new telephone number will be Temple Bar 7711 (seven lines).

Forthcoming Events

BIRMINGHAM

Oct. 15.—Institute of Vitreous Enamellers (Midland Section). "Developments of Airless Shot Blasting." H. Boardman. 7.30 p.m. Chamber of Commerce, New Street, Birmingham.

DUMBARTON

Oct. 13.—Institute of Metals (Scottish Section). Works visit. 7.30 p.m. Babcock and Wilcox, Ltd., Dumbarton.

EDINBURGH

Oct. 15.—Society of Chemical Industry and Institute of Chemistry (Edinburgh and East of Scotland Sections). "The Education of the Chemist." Symposium led by Drs. Bain, Hiscock and Wightman. North British Station Hotel, Edinburgh.

GLASGOW

Oct. 16.—Society of Chemical Industry (Glasgow Section). Refresher lecture on "Analytical Chemistry." Dr. A. B. Crawford. Arranged by the Institute of Chemistry. 8 p.m. Royal Technical College, Glasgow.

HULL

Oct. 14.—Hull Chemical and Engineering Society. Members' social evening. 7.45 p.m. City Hotel Restaurant, Lowgate, Hull.

LIVERPOOL

Oct. 15.—Institute of Chemistry (Liverpool Section). Chairman's address. "Some Recent Technical Advances in Industry." L. V. Cocks. 7.30 p.m. Constitutional Club, Liverpool.

LONDON

Oct. 13.—Society of Chemical Industry (Road and Building Materials Group). Debate, "Road Problems." Opening speakers, J. L. Sweeten, O. Cattlin, D. M. Wilson and D. G. Murdoch. 8 p.m. The Chemical Society Rooms, Burlington House, London.

Oct. 15.—Institute of Metals (London Section). Chairman's address. "The Common Field of the Engineer and Metallurgist." H. J. Gough. 7.30 p.m. National Physical Laboratory, Teddington.

Oct. 15.—Chemical Society. Ordinary scientific meeting. "Curare alkaloids. Part II. Tubocurarine and bebeerine." H. King. "Investigations on aneurin and thiochrome." A. R. Todd, F. Bergal, A. Jacob and Karimullah. "A review of some recent investigations on the sterol group." F. S. Spring. 8 p.m. Burlington House, London.

Oct. 15 and **16.**—Chemical Engineering Group. Conference on Automatic Regulators. "Electrical Control of Chemical Apparatus." A. D. Elmsly Lauchlan. "Simple Forms of Automatic Regulators." Dr. Ezer Griffiths. "The Installation Factor in Automatic Controls." Douglas Harrison. "The Application of Automatic Control to a Typical Problem in Chemical Plant." A. Callender and A. B. Stevenson. "Applications and Limitations of Self-Operating Temperature Regulators." B. T. Wingfield. "Automatic Control for Temperature and Pressure in Chemical Industry." W. J. A. Copeland. "Automatic Control of Chemical Processes." Dr. W. A. Clark. "The Influence of the Characteristics of a Plant on the Performance of an Automatic Regulator." Dr. A. Ivanoff. "Experiences of the Use and Instruments as Aids to Plant Control." E. I. Lowe and J. Frisken. 3-5 p.m. and 6-8 p.m. each day. University College, Gower Street.

Oct. 15.—Institute of Fuel. Installation of Sir Phillip Dawson, M.P., as president. Presidential address. Melchett Medal lecture. Dr. Ing. Franz Fischer. 2.30 p.m. Institution of Mechanical Engineers. Annual dinner and presentation of Melchett Medal. 7.15 p.m. Connaught Rooms, London.

NEWCASTLE-ON-TYNE

Oct 13.—Institute of Metals (North-East Coast Section). Chairman's address. "Solders." H. Dunford Smith. 7.30 p.m. Armstrong College, Newcastle-on-Tyne.

STOKE-ON-TRENT.

Oct. 12.—Ceramic Society (Pottery Section). "Some Effects of Soluble Salts in Clay Products." B. Butterworth. 7.30 p.m. North Staffordshire Technical College, Stoke-on-Trent.

SWANSEA

Oct. 12.—Institute of Metals (Swansea Section). "Some Objectives of Corrosion Research." G. D. Bengough. 6.30 p.m. Y.M.C.A., Swansea.

Inventions in the Chemical Industry

THE following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Specifications Open to Public Inspection

REMOVING FOREIGN SUBSTANCES from titanium dioxide.—American Zinc, Lead and Smelting Co. March 25, 1935. 4488/36.

PRODUCTION AND USE OF VULCANISATION ACCELERATORS.—Rubber Service Laboratories Co. March 22, 1935. 5331/36.

PRODUCING FERTILISERS.—E. V. Kaiser-Wilhelm-Institut Für Eisenforschung. March 26, 1935. 5414/36.

DESULPHURISATION OF GASES.—Sulfur-Chemie, A.-G. March 25, 1935. 6337/36.

PREPARATION OF LIGHT-SENSITIVE EMULSIONS.—Dr. C. Schleussner, A.-G. March 22, 1935. 6596/36.

HYDRATION OF OLEFINES.—Usines de Melle. March 22, 1935. 6690/36.

CONTROL OF CHEMICAL REACTIONS.—Houdry Process Corporation. March 23, 1935. 7685/36.

POLYMETHIN DYESTUFFS.—O. F. Schulz. March 22, 1935. 7738/36.

SPLITTING UP MIXTURES of hydrocarbons of high molecular weight.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. March 22, 1935. 8443/36.

SEPARATING MIXTURES of substances of high molecular weight not exclusively consisting of hydrocarbons.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. March 22, 1935. 8444/36.

REFINING HYDROCARBON OILS.—Edeleanu Ges. March 22, 1935. 8620-3/36.

DIHYDROXYSTILBENE-DI-CARBOXYLIC ACID.—I. G. Farbenindustrie. March 23, 1935. 8625/36.

MANUFACTURE OF ACID AMIDES substituted at the nitrogen atom. Soc. of Chemical Industry in Basle. March 22, 1935. 8626/36.

PRODUCING COLOURED RESISTS.—Durand and Huguenin, A.-G. March 23, 1935. 8627/36.

MANUFACTURE OF SYNTHETIC RESINS.—E. I. du Pont de Nemours and Co. March 22, 1935. 8669/36.

CONCENTRATION OF SOLUTIONS of volatile substances.—E. I. du Pont de Nemours and Co. March 23, 1935. 8670/36.

PYROLYTIC CONVERSION OF HYDROCARBON OILS.—Gyro Process Co. March 22, 1935. 8693/36.

3-ALKOXY-4-OXYBENZALDEHYDES.—C. N. Geneff. March 26, 1935. 8784/36.

POLYNUCLEAR UNSATURATED CYCLIC POLYKETONES.—Society of Chemical Industry in Basle. March 27, 1935. 8787/36.

TREATMENT OF HYDROCARBONS with chromyl chloride.—Edeleanu Ges. March 26, 1935. 9033/36.

ACID WOOL DYESTUFFS of the anthraquinone series.—I. G. Farbenindustrie. March 26, 1935. 9071/36.

VAT DYESTUFF of the anthraquinone series.—I. G. Farbenindustrie. March 26, 1935. 9072/36.

MANUFACTURING CARAMEL, and product made thereby.—F. Sornet, A. Kopka, and Chocolat-Magniez-Baussart. March 28, 1935. 9134/36.

PROCESS FOR IMPROVING EFFECTS mechanically produced on textile materials containing cellulose.—Soc. of Chemical Industry in Basle. March 28, 1935. 9400/36.

Specifications Accepted with Date of Application

SEPARATION OF MIXTURES of oily or waxy substances according to the countercurrent principle.—Naamlooze Vennootschap Vereenigde Fabrieken van Stearine, Kaarsen en Chemische Producten. Jan. 22, 1934. 453,936.

DISTILLATION AND CARBONISATION OF COAL-OIL MIXTURES.—H. P. Stephenson. Jan. 22, 1935. 454,011.

ACETALS OF POLYVINYL ALCOHOL.—I. G. Farbenindustrie. Feb. 17, 1934. 454,013.

SYNTHETIC POLYMERISATES and artificial materials therefrom.—W. W. Groves (Deutschen Celluloid-Fabrik). March 25, 1935. 454,232.

DYESTUFF-SULPHONIC ACIDS.—W. W. Groves (I. G. Farbenindustrie). March 25, 1935. (Addition to 447,899). 454,302.

OXAZOLE DYESTUFFS of the anthraquinone series.—I. G. Farbenindustrie. March 24, 1934. 454,237.

KETO-ALCOHOLS.—E. I. due Pont de Nemours and Co. and V. L. Hansley. March 25, 1935. 454,238.

PRODUCTION OF ANHYDROUS CALCIUM SULPHATE, and plasters made therefrom.—F. R. Himsworth, J. S. Dunn, and Imperial Chemical Industries, Ltd. March 25, 1935. 454,239.

TREATMENT OF CELLULOSE TEXTILE FABRICS.—Imperial Chemical Industries, Ltd., J. G. Evans, and S. A. Slater. March 25, 1935. 454,240.

MANUFACTURE OF STEROL COMPOUNDS.—A. Carpmael (I. G. Farbenindustrie). March 27, 1935. 454,260.

POLYAZO DYESTUFFS.—W. W. Groves (I. G. Farbenindustrie). March 27, 1935. 454,261.

PROCESS FOR THE MANUFACTURE OF COMPLEX DOUBLE COMPOUNDS of organic heavy metal mercapto compounds.—Schering-Kahlbaum, A.-G. March 29, 1934. 454,244.

PRODUCTION OF FERRO-MANGANESE.—Mannesmannröhren-Werke and Sachtleben, A.-G., für Bergbau und Chemische Industrie. July 23, 1934. 454,165.

PRODUCTION OF DYEINGS and printings on fibrous material.—Soc. of Chemical Industry in Basle. May 19, 1934. 453,953.

REMOVAL OF HYDROGEN SULPHIDE FROM GASES.—South Metropolitan Gas Co., and E. H. Boiling. May 4, 1935. 454,175.

SEPARATION OF WAXY CONSTITUENTS from hydrocarbon oils.—Standard Oil Development Co. July 19, 1934. 454,176.

MANUFACTURE OF HYDROAROMATIC AMINO-ALCOHOLS and derivatives thereof.—A. G. Bloxam (Soc. of Chemical Industry in Basle). May 30, 1935. 454,042.

RECOVERY OF HYDROCYANIC ACID from coke oven or other hydrogen-sulphide-containing gases.—Röhm and Haas Co. July 9, 1934. 453,971.

NUCLEUS-SUBSTITUTED ALIPHATIC-AROMATIC SULPHONIC ACIDS.—Chemische Fabrik R. Baumheier, A.-G. Jan. 23, 1935. 454,183.

TREATING THE PRODUCTS OF THE SYNTHESIS OF BENZENE from hydrogen and the oxides of carbon.—Studien-Und Verwertungsges. July 19, 1934. 453,973.

METHODS AND APPARATUS FOR THE DESTRUCTIVE DISTILLATION OF SOLID OR PASTY CARBONACEOUS MATERIALS.—Physical Chemistry Research Co. Feb. 21, 1935. 454,185.

PACKING SOLID SUBSTANCES having sulphuric acidity such as bisulphates.—L. Löwenstein. Nov. 21, 1935. 453,981.

PRODUCING MAGNETIC POWDER.—H. Vogt. Jan. 30, 1935. 454,206.

PREPARATION OF 1:1-DICHLORETHANE.—Consortium für Elektrochemische Industrie Ges. Feb. 22, 1935. 454,128.

SEPARATION OF GASES.—Ges für Linde's Eismaschinen A.-G. Feb. 23, 1935. 454,130.

HEAT TREATMENT OF DESTRUCTIVE HYDROGENATION RESIDUES.—International Hydrogenation Patents Co., Ltd. March 15, 1935. 454,132.

PRODUCTION OF HYDROGEN PEROXIDE.—Naamlooze Vennootschap Industrieele Maatschappij Voorheen Noury and Van Der Lande. April 12, 1935. 454,209.

PROCESS OF SEPARATING SOLUTIONS OR LIQUID MIXTURES into their components by cooling and crystallisation.—Ges für Lindes' Eismaschinen, A.-G., and G. A. Krause. June 8, 1935. 454,084.

Applications for Patents

(September 24 to 30 inclusive.)

APPARATUS FOR MEASUREMENT OF FLOW OF FLUIDS.—Askania-Werke, A.-G. (Germany, Sept. 25, '35.) 26117.

CELLULOSE ESTER COMPOSITIONS.—H. A. Auden. 26545.

PROCESS OF REMOVING WATER FROM SOLUTIONS.—Autoxygen Inc. (United States, Oct. 1, '35.) 26572.

MOULDING OF SYNTHETIC RESIN, ETC. ARTICLES.—E. C. Bell. 26163.

MEASURING PREDETERMINED QUANTITIES BY WEIGHING.—Berkel Auto-Scale Co., Ltd. (Maatschappij van Berkel's Patent Naamlooze Vennootschap). 25926.

DYEING, ETC. TEXTILE FIBRES.—J. Brandwood. 26145.

SINTERED HARD CARBIDE COMPOSITION.—British Thomson-Houston Co., Ltd. (United States, Sept. 28, '35.) 26259, 26260.

DISTILLATION OF SOLID CARBONACEOUS MATERIALS mixed with oil. E. W. Brocklebank. 25981.

ALKALI SILICATE CEMENTS, ETC.—Carborundum Co. (United States, Oct. 4, '35.) 26303, 26304.

MANUFACTURE OF POLYMERISED CARBOXYLIC ACIDS.—A. Carpmael (I. G. Farbenindustrie). 26095.

ADHESIVES.—A. Carpmael (I. G. Farbenindustrie). 26096, 26097.

DECALIFICATION OF DOLOMITE.—H. H. Chesny. 25908.

PREPARATION OF MATERIALS BY FLOTATION.—C. E. Every-Clayton (Smidth and Co.). 26000.

PREPARATION OF COMPOSITIONS containing urea-formaldehyde condensation products.—L. W. Coveney. 26307.

PRODUCTION OF ALCOHOL.—Deutsche Gold-und Silber-Scheideanstalt vorm Roessler. (Switzerland, April 11.) 26103.

CELLULOSE-ESTER COMPOSITIONS.—Distillers Co., Ltd. 26545.

DEVICES FOR PASTEURISATION OF GAS-CONTAINING LIQUIDS.—K. Fehrmann. 26448.

CONDITIONING OF GASES.—W. L. Fleisher. 26394.

PROCESS FOR SEPARATING CARBON MONOXIDE FROM GAS.—L. Lombard-Gerin. (France, Sept. 30, '35.) 26470.

MANUFACTURE OF DISAZO DYESTUFFS.—W. W. Groves (I. G. Farbenindustrie). 25956.

MANUFACTURE OF POLYGLYCOL ETHERS.—W. W. Groves. 26062, 26063.

MANUFACTURE OF MONO-HALOGENATION PRODUCTS.—W. W. Groves. 26064.

ANTHRAQUINONE DYESTUFFS.—N. H. Haddock. 26263.

MANUFACTURE OF CONDENSATION PRODUCTS containing nitrogen and sulphur.—W. W. Groves. 26529.

PROCESS FOR TREATING MATERIALS.—W. W. Groves (Soc. of Chemical Industry in Basle). 26060.

POWDER METALLURGY.—Hardy Metallurgical Co. (Feb. 14). (United States, Sept. 24, '35.) 26565.

METHODS OF INCREASING THE PERMEABILITY OF SILICON IRON.—Heraeus-Vacuumschmelze, A.-G. (Germany, Oct. 29, '35.) 26102.

ANTHRAQUINONE DYESTUFFS.—R. N. Heslop. 26263.

PRODUCTION OF RUBBER-CONTAINING COATING.—W. J. H. Hinrichs. 26568.

CELLULOSE ESTER COMPOSITIONS.—H. M. Hutchinson. 26545.

LACQUERING LAYERS OF PHOTOGRAPHIC MATERIAL.—I. G. Farbenindustrie. (Germany, Nov. 8, '35.) 25957.

MANUFACTURE, ETC., OF POLYMERISATION PRODUCTS OF ACETYLENE. I. G. Farbenindustrie. 25959.

PRODUCTION OF STEREOSCOPIC COLOUR PICTURES.—I. G. Farbenindustrie. (Germany, Oct. 30, '35.) 26065.

MANUFACTURE OF CELLULOSE ARTICLES.—I. G. Farbenindustrie. (Germany, Sept. 28, '35.) 26177.

MANUFACTURE OF NITRILES OF THE C_n SERIES.—I. G. Farbenindustries. (Germany, Sept. 28, '35.) 26247.

MANUFACTURE OF POLYMERISATION PRODUCTS.—I. G. Farbenindustrie. (Germany, Sept. 28, '35.) 26248.

PROCESSES INVOLVING HEATING OF SOLID COMPOUNDS.—I. G. Farbenindustrie. (Germany, Sept. 27, '35.) 26262.

MANUFACTURE, ETC., OF COATING COMPOSITIONS.—I. G. Farbenindustrie. 26268.

MANUFACTURE OF POLYMERISATION PRODUCTS.—I. G. Farbenindustrie and W. W. Groves. 26386.

ANTHRAQUINONE DYESTUFFS.—Imperial Chemical Industries, Ltd. 26263.

PROCESS FOR THE CATALYTIC HYDROGENATION OF POLYMERS OF UNSATURATED HYDROCARBONS.—International Hydrogenation Patents Co., Ltd. (United States, Sept. 28, '35.) 26214.

MANUFACTURE, ETC., OF POLYAMINO CARBOXYLIC ACIDS.—G. W. Johnson (I. G. Farbenindustrie). 26266.

STABILISATION OF POLYVINYL COMPOUNDS.—G. W. Johnson (I. G. Farbenindustrie). 26267.

FLUID-LEVEL INDICATING DEVICE.—J. L. Johnson. 26027.

DISTILLATION OF SOLID CARBONACEOUS MATERIALS mixed with oil. W. H. Jones. 25981.

MANUFACTURE OF CELLULOSE, ETC. SHEETS.—Koepp and Co. R. Chemische Fabrik, A.-G. (Germany, Sept. 30, '35.) 26440, 26441.

CHEMICAL CONVERSIONS.—G. Lord. 26165.

PREPARATION OF FRACTIONS FROM LIQUID HYDROCARBON MIXTURES. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. (Holland, Oct. 3, '35.) 26319.

PRODUCTION OF HYDROGEN.—Oesterreichisch Amerikanische Magnesit A.-G. (Austria, Oct. 23, '35.) 26169.

PREPARATION OF PHENOL FORMALDEHYDE CONDENSATION PRODUCTS. Pollopas Patents, Ltd. (Austria, Oct. 7, '35.) 26354, 26355.

PRODUCTION OF POLYVINYL RESINS.—H. E. Potts (Shawinigan Chemicals, Ltd.) 26239.

PREPARATION OF COMPOSITIONS containing urea-formaldehyde condensation products.—S. L. M. Saunders. 26307.

MANUFACTURE, ETC., OF CHROMATE REFRACTORIES.—G. E. Seil. (United States, Oct. 10, '35.) 25960.

MANUFACTURE OF ZINC OXIDE.—Smelting Metallurgische-und Metallwerke A.-G. (Germany, Sept. 28, '35.) 26300.

INSOLUBLE COLOURED PRODUCTS.—Soc. de Produits Colorants et Plastiques. (France, Oct. 8, '35.) 26574.

MANUFACTURE, ETC. OF PETROLEUM PRODUCTS.—Socony-Vacuum Oil Co., Inc. (United States, Oct. 3, '35.) 26397.

MANUFACTURE OF PETROLEUM PRODUCTS.—Socony-Vacuum Oil Co., Inc. (United States, Oct. 26, '35.) (Cognate with 26397). 26398.

MANUFACTURE OF PETROLEUM PRODUCTS.—Socony-Vacuum Oil Co., Inc. (United States, Nov. 16, '35.) (Cognate with 26397.) 26399.

ANTHRAQUINONE DYESTUFFS.—W. W. Tatum. 26263.

PLASTIC COMPOUNDS FOR FOOTWEAR.—R. Very. 26494.

GAS MASKS, ETC.—H. E. de Villiers. 26550.

MEANS FOR RENDERING CHAMBERS GAS-PROOF.—H. E. de Villiers. 26551.

VULCANISATION OF RUBBER.—Wingfoot Corporation. (United States, Oct. 12, '35.) 26510, 26511.

Chemical and Allied Stocks and Shares

SINCE the beginning of the new Stock Exchange account on Monday the stock and share markets have shown a further increase of activity and on balance for the week there has been a fairly general upward movement in share values. Imperial Chemical were particularly active and participated in the upward movement in leading industrial shares with a rise of nearly 2s. to 42s. 7½d. Salt Union were moderately higher at 43s. 4½d. and B. Laporte remained steady at 130s. Turner and Newall were a good feature and have moved up further from 97s. 3d. to 101s. 3d. in response to the belief that a favourable increase in dividend is in prospect. It is generally assumed that the demand for asbestos is continuing to expand both for industrial purposes and in connection with the equipment of the Defence Forces. A better tendency developed in Borax Consolidated deferred which improved to 34s. 9d. The recent announcement that, in accordance with the usual practice in recent years, no interim payment is to be made on the preferred shares caused disappointment in the market. It is realised, however, that the company is probably making further progress and the disposition is to budget for a larger dividend on the deferred shares.

Goodlass Wall and Lead Industries were again firm and continued to maintain their recent rise on the belief that the upward trend in the price of lead, which has remained in evidence, is a favourable point for the company. Imperial Smelting moved up 3d. to 16s. It is generally expected that the results, due next month, will show favourable improvement in profits, but there is still some uncertainty in the market as to whether dividends will be resumed at this stage. Burt, Boulton & Haywood were steady, as were Fison, Packard and Prentice and Erinoid. Results of the two last-named companies are imminent. Cooper, McDougall and Robertson continued to come in for more attention on the assumption that the outlook for the company's business in the Argentine is improving, and there was increased activity in the shares reported at around 36s. 6d.

Unilever, which were again a prominent feature, have risen further on balance for the week. It is being assumed that not only will benefits be derived from less uncertain foreign exchange conditions, but also from the rise in the prices of East African produce in view of the Unilever group's controlling interest in the United Africa Co. Good demand developed for Babcock and Wilcox when it became more generally realised that the company is among those which would probably be assisted a good deal by better world trade conditions. In their last report the directors drew attention to the fact that a large proportion of the company's business is for export. The interim dividend falls to be announced shortly, but it is generally believed that all question of an increase will be left until the final payment.

Stewarts and Lloyds have held the higher level which followed the recent announcement of the proposed issue of shares on bonus terms. Consett Iron were higher. The latter are out of the dividend list, but now the capital has been reconstructed it is believed in the market that the next report can be expected to show a favourable dividend, particularly as the upward movement in profit is probably being accelerated. United Molasses were steady around 26s. 4½d. Distillers were higher at 108s. 9d. and activity was again shown in the ordinary and deferred shares of Petroleum Storage and Finance. Associated Portland Cement were higher, it being pointed out that on the basis of a dividend of 25 per cent., for which the market is budgeting, a very favourable yield would be offered. Paint shares were relatively dull, but Lewis Berger were steady, aided by hopes of an increase in dividend from 15 per cent. to 17½ per cent. being announced next month. Courtaulds were active and made higher prices, as it is realised that a larger income is likely in future from the company's important shareholdings in leading rayon companies on the Continent and in the United States.

British Celanese second preference were bought; allowing for the arrears of dividend carried, they appear to be undervalued in relation to the ordinary shares and these arrears will, of course, have to be paid or dealt with by a funding scheme of some kind before a payment can be made on the ordinary shares. Calico Printers came in for better demand and improved moderately in price. International Nickel responded strongly to the buoyancy of American markets. It is being confidently predicted that the statement for the September quarter will show a further good advance in the company's profits.

Oil shares were active, the larger interim dividend of 5 per cent. announced by the Burmah Oil Co. having continued to influence sentiment and it has also led to increased expectations of a resumption of interim dividends by the "Shell" Co.

Books Received

Survey of the Import Trade of India during the first three months of the fiscal year April 1 to June 30, 1936. London: Department of Overseas Trade.

Air Raid Precautions Handbook, No. 4. Decontamination of Materials (1st edition). London: H.M. Stationery Office. Pp. 70. 6d.

Weekly Prices of British Chemical Products

PRICES of a number of wood distillation products have been changed during the week. Acetate of lime, brown, has increased from £8-£8 10s. to £8 10s.-£9 per ton, grey from £10 5s.-£10 15s. to £10 10s.-£11, and liquor, brown, 30° Tw., which was 8d. per gal. is now 6d.-8d. Charcoal has gone up from £5-£10 to £5 5s.-£10 per ton; solvent wood naphtha is now 3s. 6d.-3s. 9d. per gal. against 3s. 9d., and wood tar has risen from £2-£2 10s. to £2-£3 per ton. In the rubber chemicals section cadmium sulphide has been increased from 3s. 8d.-3s. 11d. to 3s. 11d.-4s. per lb., while lamp black has been reduced from £24-£26 to £23-£24 per ton. Amongst the coal tar products, pyridine 90/140 has risen from 6s.-7s. 3d. to 6s.-9s. per gal. Prices of general heavy chemicals, pharmaceutical and photographic chemicals, perfumery chemicals, essential oils and intermediates remain unchanged. Unless otherwise stated the prices below cover fair quantities net and naked at sellers' works.

MANCHESTER.—Generally steady price conditions continue in evidence on the Manchester market for chemicals although at the moment there is no substantial buying going on in any department. Traders this week have reported only a moderate volume of business, much of it relating to early deliveries of the bread-and-butter lines of chemicals. From the point of view of deliveries against contracts, however, the general position in Lancashire and West Yorkshire continues to be reasonably satisfactory and a fair volume of specifications has come to hand during the past week, particularly for the heavy alkalis and acids. Pitch makers are not disposed to accept the low offers that are being made for shipment parcels but the outlook for this material is somewhat uncertain. Most of the other by-products are steady and in fair demand.

GLASGOW.—There has again been a slight improvement in the demand for chemicals for home trade during the week, but export business still remains very quiet. Prices generally continue steady at about previous figures with lead and copper products very firm in sympathy with the metals. The market for coal tar by-products has been very steady throughout the week. Motor benzole movements have been regular at prices quoted, and crude benzole shows a slight advance with actual fresh business done round 9d. to 10d. per gal. according to quality. American duty-free cresylic acid is reported in demand greater than the supply, and dark 97/99 has realised from 2d. to 3d. per gal. more than last week, although the quantities available are still definitely limited. Pitch for export is rather dull, but there has been an improvement in the tonnage moving.

General Chemicals

ACETONE.—£62 to £65 per ton; SCOTLAND: £64 to £65 ex wharf, according to quantity.

ACID, ACETIC.—Tech., 80%, £30 5s. to £32 5s. per ton; pure 80%, £32 5s. to £34 5s.; tech., 40%, £16 12s. 6d. to £18 12s. 6d.; tech., 60%, £23 10s. to £25 10s. SCOTLAND: Glacial 98/100%, £48 to £52; pure 80%, £32 5s.; tech., 80%, £30 5s., d/d buyers' premises Great Britain. MANCHESTER: 80%, commercial, £30 5s.; tech. glacial, £42 to £46.

ACID, BORIC.—Commercial granulated, £27 per ton; crystal, £28; powdered, £29; extra finely powdered, £31; packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. B.P. cryst., £36; B.P. powder, £37. SCOTLAND: Crystals, in 1 cwt. bags, £28; powdered, in 1 cwt. bags, £29.

ACID, CHROMIC.—Flaked, 10d. per lb., less 2½%; ground, 10¼d. per lb., less 2¼%, d/d U.K.

ACID, CITRIC.—1s. per lb. MANCHESTER: 11¾d. to 1s. SCOTLAND: B.P. crystals, 11¾d. to 1s. per lb., less 5%.

ACID, CRESYLIC.—97/99%, 3s. to 3s. 1d. per gal.; pale, 98%, 3s. 1d. to 3s. 2d.; dark, 2s. 6d. to 2s. 7d.; 99/100%, refined, 3s. 4d. to 3s. 6d. per gal. MANCHESTER: 99/100%, pale, 3s. 7d.

ACID, FORMIC.—85%, in carboys, ton lots, £42 to £47 per ton.

ACID, HYDROCHLORIC.—Spot, 4s. to 6s. carboy d/d according to purity, strength and locality. SCOTLAND: Arsenical quality, 4s.; dearsenicated, 5s. ex works, full wagon loads.

ACID, LACTIC.—LANCASHIRE: Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50: pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50% by vol., £41. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £18 to £25 per ton makers' works. SCOTLAND: 80°, £24 ex station full truck loads.

ACID, OXALIC.—£48 15s. to £57 10s. per ton, according to packages and position. SCOTLAND: £2 10s. per cwt. in casks. MANCHESTER: £49 to £54 10s. per ton ex store.

ACID, SULPHURIC.—SCOTLAND: 144° quality, £3 12s. 6d.; 168°, £7; dearsenicated, 20s. per ton extra.

ACID, TARTARIC.—1s. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. SCOTLAND: 11¾d. less 5%. MANCHESTER: 11¾d. to 1s. per lb.

ALUM.—SCOTLAND: Ground, £10 2s. 6d. per ton; lump, £9 12s. 6d.

ALUMINA SULPHATE.—LONDON: £7 10s. to £8 per ton. SCOTLAND: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10d. to 1s. containers extra and returnable

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

AMMONIUM CARBONATE.—SCOTLAND: Lump, £30 per ton; powdered, £33, in 5-cwt. casks d/d buyers' premises U.K.

AMMONIUM CHLORIDE.—LONDON: Fine white crystals, £18 to £19. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

AMMONIUM SULPHATE.—Neutral quality, 20.6% nitrogen, £6 16s. per ton.

ANTIMONY OXIDE.—SCOTLAND: £61 to £65 per ton, c.i.f. U.K. ports.

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 1d. per lb.; crimson, 1s. 5½d. to 1s. 7d. per lb., according to quality.

ARSENIC.—LONDON: £13 10s. per ton c.i.f. main U.K. ports for imported material; Cornish nominal, £22 10s. f.o.r. mines. SCOTLAND: White powdered, £17 10s. ex store. MANCHESTER: White powdered Cornish £19 ex store.

ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.

BARIUM CHLORIDE.—LONDON: £10 10s. per ton. SCOTLAND: £11.

BARYTES.—£6 10s. to £8 per ton.

BISULPHITE OF LIME.—£6 10s. per ton f.o.a. London.

BLEACHING POWDER.—Spot, 35/37%. £7 19s. per ton in casks, special terms for contracts. SCOTLAND: £9.

BORAX COMMERCIAL.—Granulated, £14 10s. per ton; crystal £15 10s.; powdered, £16; finely powdered, £17; packed in 1-cwt. bags, carriage paid home to buyer's premises within the United Kingdom in 1-ton lots. SCOTLAND: Granulated, £14 10s. per ton in 1 cwt. bags, carriage paid.

CADMIUM SULPHIDE.—3s. 11d. to 4s. per lb.

CALCIUM CHLORIDE.—Solid 70/75% spot, £5 5s. per ton d/d station in drums. SCOTLAND: £5 10s. per ton net ex store.

CARBON BISULPHIDE.—£31 to £33 per ton, drums extra.

CARBON BLACK.—3¾d. to 4¾d. per lb. LONDON: 4¼d. to 5d.

CARBON TETRACHLORIDE.—SCOTLAND: £41 to £43 per ton, drums extra.

CHROMIUM OXIDE.—10¾d. per lb., according to quantity d/d U.K.; green, 1s. 2d. per lb.

CHROMETAN.—Crystals, 2¾d. per lb.; liquor, £19 10s. per ton d/d

COPPERAS (GREEN).—SCOTLAND: £3 15s. per ton, f.o.r. or ex works.

CREAM OF TARTAR.—£3 19s. per cwt. less 2½%. LONDON: £3 17s. per cwt. SCOTLAND: £3 18s. net.

DINITROTOLUENE.—66/68° C., 9d. per lb.

DIPHENYLGUANIDINE.—2s. 2d. per lb.

FORMALDEHYDE.—LONDON: £24 10s. per ton. SCOTLAND: 40%, £25 to £28 ex store.

IODINE.—Resublimed B.P., 5s. 1d. per lb.

LAMPBLACK.—£23 to £24 per ton.

LEAD ACETATE.—LONDON: White, £33 15s. per ton; brown, £1 per ton less. SCOTLAND: White crystals, £34 to £35; brown, £1 per ton less. MANCHESTER: White, £35, brown, £33 10s.

LEAD NITRATE.—£32 10s. to £34 10s. per ton.

LEAD, RED.—SCOTLAND: £32 10s. per ton less 2½%, carriage paid, for 2-ton lots.

LEAD, WHITE.—SCOTLAND: £40 per ton, carriage paid. LONDON: £41.

LITHOPONE.—30%, £16 to £16 5s. per ton.

MAGNESITE.—SCOTLAND: Ground calcined, £9 per ton, ex store.

MAGNESIUM CHLORIDE.—SCOTLAND: £6 17s. 6d. per ton.

MAGNESIUM SULPHATE.—Commercial, £5 per ton, ex wharf.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O P., 1s. 9d. to 2s. 4d.

PARAFFIN WAX.—SCOTLAND: 3⅝d. per lb.

PHENOL.—6¾d. to 7¼d. per lb.

POTASH, CAUSTIC.—LONDON: £42 per ton. MANCHESTER: £38.

POTASSIUM BICHROMATE.—Crystals and Granular, 5d. per lb. less 5%, d/d U.K. Ground, 5¼d. LONDON: 5d. per lb. less 5%, with discounts for contracts. SCOTLAND: 5d. per lb. less 5% carriage paid. MANCHESTER: 5d.

POTASSIUM CHLORATE.—LONDON: £37 to £40 per ton. SCOTLAND: 4¼d. per lb. MANCHESTER: £39 per ton.

POTASSIUM CHROMATE.—6½d. per lb. d/d U.K.

POTASSIUM IODIDE. B.P. 4s. 3d. per lb.

POTASSIUM NITRATE.—SCOTLAND: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 8¼d. per lb. SCOTLAND: B.P. Crystals 8¾d. MANCHESTER: B.P. 10½d. to 11½d.

POTASSIUM PRUSSIATE.—LONDON: Yellow, 7½d. to 8d. per lb. SCOTLAND: 7½d. net, ex store. MANCHESTER: Yellow, 8d. to 8¼d.

Salammoniac.—First lump spot, £41 17s. 6d. per ton d/d in barrels. **Scotland**: Large crystals, in casks, £36.

Soda Ash.—58% spot, £5 12s. 6d. per ton f.o.r. in bags.

Soda, Caustic.—Solid, 76/77° spot, £13 17s. 6d. per ton d/d station. **Scotland**: Powdered 98/99%, £17 10s. in drums, £18 5s. in casks, Solid 76/77°, £14 12s. 6d. in drums; 70/73%, £14 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less. **Manchester**: £13 5s. to £14 contracts.

Soda Crystals.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

Sodium Acetate.—**London**: £21 per ton. **Scotland**: £17 15s. per ton net ex store.

Sodium Bicarbonate.—Refined spot, £10 10s. per ton d/d station in bags. **Scotland**: £12 10s. per ton in 1 cwt. kegs, £10 15s. per ton in 2 cwt. bags. **Manchester**: £10 10s.

Sodium Bichromate.—Crystals cake and powder 4d. per lb. net d/d U.K. discount 5%. Anhydrous, 5d. per lb. **London**: 4d. per lb. less 5% for spot lots and 4d. per lb. with discounts for contract quantities. **Manchester**: 4d. per lb. **Scotland**: 4d., less 5% carriage paid.

Sodium Bisulphite Powder.—60/62%, £20 per ton d/d 1 cwt. iron drums for home trade.

Sodium Carbonate, Monohydrate.—£15 per ton d/d in minimum ton lots in 2 cwt. free bags. Soda crystals, **Scotland**: £5 to £5 5s. per ton ex quay or station. Powdered or pea quality, 7s. 6d. per ton extra. Light Soda Ash, £7 ex quay, min. 4-ton lots with reductions for contracts.

Sodium Chlorate.—£29 per ton. **Scotland**: £1 10s. per cwt.

Sodium Chromate.—4d. per lb. d/d U.K.

Sodium Hyposulphite.—**Scotland**: Large crystals English manufacture, £9 5s. per ton ex stations, min. 4-ton lots. Pea crystals, £14 10s. ex station, 4-ton lots. **Manchester**: Commercial, £10 5s.; photographic, £14 10s.

Sodium Iodide.—B.P., 6s. per lb.

Sodium Metasilicate.—£14 per ton, d/d U.K. in cwt. bags.

Sodium Nitrite.—**London**: Spot, £18 5s. to £20 5s. per ton d/d station in drums.

Sodium Perborate.—10%, 9½d. per lb. d/d in 1-cwt. drums. **London**: 10d. per lb.

Sodium Phosphate.—£13 per ton.

Sodium Prussiate.—**London**: 5d. to 5½d. per lb. **Scotland**: 5d. to 5¾d. ex store. **Manchester**: 4¾d. to 5d.

Sodium Silicate.—140° Tw. Spot, £8 per ton. **Scotland**: £8 10s.

Sodium Sulphate (Glauber Salts).—£4 2s. 6d. per ton d/d **Scotland**: English material, £3 15s.

Sodium Sulphate (Salt Cake).—Unground spot, £3 12s. 6d. per ton d/d station in bulk. **Scotland**: Ground quality, £3 5s. per ton d/d. **Manchester**: £3 2s. 6d. to £3 5s.

Sodium Sulphide.—Solid 60/62% Spot, £10 15s. per ton d/d in drums; crystals 30/32%, £8 per ton d/d in casks. **Scotland**: For home consumption, Solid 60/62%, £10 5s.; broken 60/62%, £11 5s.; crystals, 30/32%, £8 7s. 6d., d/d buyer's works on contract, min. 4-ton lots. Spot solid, 5s. per ton extra. Crystals, 2s. 6d. per ton extra. **Manchester**: Concentrated solid, 60/62%, £11; commercial, £8.

Sodium Sulphite.—Pea crystals, spot, £13 10s. per ton d/d station in kegs. Commercial spot, £8 15s. d/d station in bags.

Sulphate of Copper.—**Manchester**: £15 per ton f.o.b. **Scotland**: £16 10s. per ton less 5%.

Sulphur.—£9 to £9 5s. per ton. **Scotland**: £8 to £9.

Sulphur Chloride.—5d. to 7d. per lb., according to quality.

Sulphur Precip.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.

Vermilion.—Pale or deep, 5s. 1d. per lb. in 1-cwt. lots.

Zinc Chloride.—**Scotland**: British material, 98%, £18 10s. per ton f.o.b. U.K. ports.

Zinc Sulphate.—**London**: £12 per ton. **Scotland**: £10 10s.

Zinc Sulphide.—10d. to 11d. per lb.

Nitrogen Fertilisers

Sulphate of Ammonia.—October, £6 17s. 6d. per ton; November, £6 19s.; December, £7 0s. 6d. for neutral quality basis 20.6% nitrogen delivered in 6-ton lots to farmer's nearest station.

Calcium Cyanamide.—October, £6 17s. 6d. per ton; November, £6 18s. 9d.; December, £7; carriage paid to any railway station in Great Britain in lots of 4 tons and over.

Nitro-Chalk.—£7 5s. per ton to end of June, 1937.

Nitrate of Soda.—£7 12s. 6d. per ton to end of June, 1937.

Concentrated Complete and Ammonium Phosphate Fertilisers £10 12s. to £11 1s. per ton, according to specification. N.P. fertilisers £10 5s. to £13 15s. per ton for minimum 6-ton lots delivered buyer's nearest station.

Coal Tar Products

Acid, Cresylic.—97/99%, 3s. 1d. to 3s. 2d. per gal.; 99/100%, 3s. 6d. to 4s. per gal., according to specification; pale 98%, 3s. 2d. to 3s. 3d.; dark, 2s. 9d. to 2s. 10d. **Glasgow**: Pale, 99/100%, 3s. to 3s. 6d. per gal.; pale, 97/99%, 2s. 6d. to 2s. 9d.; dark, 97/99%, 2s. 5d. to 2s. 8d.; high boiling acids, 1s. 8d. to 2s.; American specification, 2s. 9d. to 3s.

Acid, Carbolic.—Crystals, 6¾d. to 7¼d. per lb.; crude, 60's, 2s. 5d. to 2s. 6d. per gal. **Manchester**: Crystals, 6½d. to 6¾d. per lb.; crude, 2s. 7d. per gal. **Glasgow**: Crude, 60's, 2s. 4d. to 2s. 6d. per gal.; distilled, 60's, 2s. 8d. to 3s.

Benzol.—At works, crude, 8½d. to 9d. per gal.; standard motor 1s. 2d. to 1s. 2½d.; 90%, 1s. 3d. to 1s. 3½d.; pure, 1s. 7d. to 1s. 7½d. **London**: Motor, 1s. 3½d. **Glasgow**: Crude, 9d. to 10d. per gal.; motor, 1s. 2d. to 1s. 3d.

Creosote.—B.S.I. Specification standard, 5½d. per gal. f.o.r. Home, 3¾d. d/d. **London**: 4½d. f.o.r. North: 5d. London. **Manchester**: 4¾d. to 5½d. **Glasgow**: B.S.I. Specification, 5¼d. to 5¾d. per gal.; washed oil, 4¼d. to 4¾d.; lower sp. gr. oils, 4¾d. to 5d.

Naphtha.—Solvent, 90/100%, 1s. 5½d. to 1s. 6½d. per gal.; 95/160%, 1s. 7d.; 90%, 1s. to 1s. 2d. **London**: Solvent, 1s. 3½d. to 1s. 4d.; heavy, 11d. to 1s. 0½d. f.o.r. **Glasgow**: Crude, 5½d. to 6d. per gal.; 90% 160, 1s. 4d. to 1s. 5d.; 90% 190, 1s. to 1s. 1d.

Naphthalene.—Crude, whizzed or hot pressed, £12 to £13 per ton; purified crystals, £22 10s. per ton in 2-cwt. bags. **London**: Fire lighter quality, £5 to £5 10s. per ton; crystals, £27 to £27 10s. **Glasgow**: Fire lighter, crude, £7 to £8 per ton (bags free).

Pyridine.—90/140%, 6s. to 9s. per gal.; 90/180, 2s. 3d. **Glasgow**: 90% 140, 6s. to 6s. 6d. per gal.; 90% 160, 5s. to 5s. 6d.; 90% 180, 2s. 6d.

Toluol.—90%, 1s. 11d. per gal.; pure, 2s. 3d. **Glasgow**: 90% 120, 1s. 10d. to 1s. 11d. per gal.

Xylol.—Commercial, 2s. 1d. per gal.; pure, 2s. 3d. **Glasgow**: Commercial, 1s. 11d. to 2s. per gal.

Pitch.—Medium, soft, 35s. per ton, in bulk at makers' works. **Manchester**: 32s. 6d. f.o.b., East Coast. **Glasgow**: f.o.b. Glasgow, 30s. to 35s. per ton; in bulk for home trade, 32s. 6d.

Wood Distillation Products

Acetate of Lime.—Brown, £8 10s. to £9 per ton; grey, £10 10s. to £11. Liquor, brown, 30° Tw., 6d. to 8d. per gal. **Manchester**: Brown, £9 10s.; grey, £11 10s.

Charcoal.—£5 5s. to £10 per ton, according to grade and locality.

Methyl Acetone.—40-50%, £45 to £48 per ton.

Wood Creosote.—Unrefined 6d. to 1s. 6d. per gal., according to boiling range.

Wood, Naphtha, Miscible.—2s. 9d. to 3s. 3d. per gal.; solvent, 3s. 6d. to 3s. 9d. per gal.

Wood Tar.—£2 to £3 per ton.

Intermediates and Dyes

Acid, Benzoic, 1914 B.P. (ex toluol).—1s. 9½d. per lb. d/d buyer's works.

Acid, Gamma.—Spot, 4s. per lb. 100% d/d buyer's works.

Acid, H.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.

Acid Naphthionic.—1s. 8d. per lb.

Acid, Neville and Winther.—Spot, 3s. per lb. 100%.

Acid, Sulphanilic.—Spot, 8d. per lb. 100%, d/d buyer's works.

Aniline Oil.—Spot, 8d. per lb., drums extra, d/d buyer's works.

Aniline Salts.—Spot, 8d. per lb. d/d buyer's works, casks free.

Benzidine, HCl.—2s. 5d. per lb., 100% as base, in casks.

o-**Cresol** 30/31° C.—6½d. to 7½d. per lb. in 1-ton lots.

p-**Cresol** 34-5° C.—1s. 7d. to 1s. 8d. per lb. in ton lots.

m-**Cresol** 98/100%.—1s. 8d. to 1s. 9d. per lb. in ton lots.

Dichloraniline.—1s. 11½d. to 2s. 3d. per lb.

Dimethylaniline.—Spot, 1s. 6d. per lb., package extra.

Dinitrobenzene.—8d. per lb.

Dinitrotoluene.—48/50° C., 9d. per lb.; 66/68° C., 10½d.

Dinitrochlorbenzene, Solid.—£72 per ton.

Diphenylamine.—Spot, 2s. per lb., d/d buyer's works.

α-Naphthol.—Spot, 2s. 4d. per lb., d/d buyer's works.

β-Naphthol.—In bags, £88 15s. per ton; in casks, £89 15s.

α-Naphthylamine.—Lumps, 1s. per lb.; ground, 1s. 0½d.

β-Naphthylamine.—Spot, 2s. 9d. per lb., d/d buyer's works in casks.

o-**Nitraniline.**—3s. 11d. per lb.

m-**Nitraniline.**—Spot, 2s. 7d. per lb., d/d buyer's works.

Latest Oil Prices

London, Oct. 7.—**Linseed Oil** was quiet. Spot, £26 10s. per ton (small quantities); Oct., £23 17s. 6d.; Nov.-Dec., £24; Jan.-April, £24 2s. 6d.; May-Aug., £24 5s., naked. **Soya Bean Oil** was steady. Oriental (bulk), spot, Rotterdam, £24 10s. per ton. **Rape Oil** was inactive. Crude, extracted, £33 10s. per ton; technical, refined, £34 10s., naked, ex wharf. **Cotton Oil** was easy. Egyptian, crude, £27 per ton; refined common edible, £30 10s.; and deodorised, £32 10s., naked, ex mill (small lots £1 10s. extra). **Turpentine** was steady. American, spot, 38s. 9d. per cwt.

Hull.—**Linseed Oil**, spot, quoted £24 10s. per ton; Oct. and Nov.-Dec., £24; Jan.-April, £24 2s. 6d.; May-Aug., £24 5s. **Cotton Oil.**—Egyptian, crude, spot, £26 per ton; edible, refined, spot, £29 10s.; technical, spot, £29 10s.; deodorised, £31 10s., naked. **Palm Kernel Oil.** Crude, f.m.q., spot, £24 10s. per ton, naked. **Groundnut Oil.** Extracted, spot, £34 per ton; deodorised, £37. **Rape Oil.** Extracted, spot, £32 10s. per ton; refined, £33 10s. **Soya Oil.**—Extracted, spot, £29 10s. per ton; deodorised, £32 10s. **Cod Oil.**—F.o.r. or f.a.s., 25s. per cwt., in barrels. **Castor Oil.**—Pharmaceutical, 42s. per cwt.; first, 37s.; second, 35s. **Turpentine.**—American, spot, 40s. 9d. per cwt.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

(NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

E. W. EDWARDSON AND CO., LTD., Enfield, glue and soap manufacturers. (M., 10/10/36.) September 29, £5,000 (not ex.) charge, to Lloyds Bank Ltd.; charged on Brimsdown Glue Works, Enfield.

GEORGE CATCHESIDE, LTD., Willington Quay, oil and fat merchants. (M., 10/10/36.) September 25, £850 mortgage, to N. H., C. & C. E. Arnison, all Penrith; charged on factory, etc., at Howden Pans, Wallsend. *Nil. December 20, 1935.

Satisfactions

HADFIELDS (MERTON) LTD., Mitcham, varnish manufacturers, etc. (M.S., 10/10/36.) Satisfaction September 23, of debentures registered March 2, 1917, by cancellation of £3,000 unissued debentures of the series.

County Court Judgments

(NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court Judgments against him.)

BEAUCAIRE LABORATORIES (sued as a firm), 14 America Square, Minories, chemists. (C.C., 10/10/36.) £16 19s. 9d. August 4.

Companies Winding-up Voluntarily

BIOCHEMICA, LTD. (C.W.U.V., 10/10/36.) By special resolution, September 25, 1936. Mr. Francis Wolfe Slattery, of 14 Clarges Street, London, W.1, appointed liquidator.

Partnerships Dissolved

ALFRED BOLTON and EPHRAIM WOOLF, carrying on business as manufacturing chemists' sundriesmen, at 599 High Road, Leyton, in the county of Essex, under the style of The Iodine Products Manufacturing Co. As from September 21, 1936, so far as concerns Ephraim Woolf, who retires from the firm.

Receiverships

NEW SCIENTIFIC PRODUCTS, LTD., cleaning materials, etc., 86-88 Eden Street, Kingston-on-Thames. (R., 10/10/36.) H. G. Wicks, of 1 Raymond Buildings, Grays Inn, W.C.1, was appointed receiver and manager on September 21, 1936, under powers contained in debenture dated August 7, 1936.

Company News

Midland Tar Distillers.—A final dividend of 2½ per cent. has been announced on the ordinary shares, making 5 per cent., tax free (same), for the year.

United Tar Distillers.—A final dividend of 2½ per cent. has been announced for the ordinary shares, making 5 per cent., tax free (same), for the year.

Marley Hill Chemical Co., Ltd.—A declaration of solvency has been filed relating to the company which was registered as a private company on November 29, 1920, but was converted into a public company on February, 1924. The company acquired from John Bowes and Partners, Ltd., the coke ovens and bye-products works, with loose plant, near Marley Hill, Durham. The authorised capital is £300,000 in £1 ordinary shares, of which to January 2, 1936, 235,375 had been issued and fully paid up.

Dunlop Rubber Co.—The directors announce that trading results for the current year to date compare favourably with those of last year. The dividends on the £1,000,000 6½ per cent. cumulative "A" preference shares, the £1,000,000 7 per cent. cumulative "B" preference shares and £2,400,000 10 per cent. cumulative "C" preference shares will be paid on October 31 as usual. No interim dividend has been paid on the £7,851,045 issued ordinary capital for several years past, but since 1932 the final distributions have been at the rate of 8 per cent., less tax.

Borax Consolidated, Ltd.—The directors have considered the matter of an interim dividend on the 6 per cent. preferred ordinary shares, and have resolved to postpone the consideration of a dividend until after the completion of the accounts for the past financial year. For 1933-34 and 1934-35, the full 6 per cent. was paid. A payment of 5 per cent. was made on the deferred shares for 1934-35. Issued and paid capital is £2,700,000, divided into £800,000 in 5½ per cent. cumulative preference shares of £10, £600,000 in 6 per cent. preferred ordinary shares of £5, and £1,300,000 in £1 deferred ordinary shares.

Murex, Ltd.—A trading profit of £216,335 for the year ended June 30, 1936, is announced. The corresponding figure for the previous year was £190,391. Adding dividends and interest received, discounts and transfer fees, amounting altogether to £62,406, there is a gross total of £278,741, from which is deducted all expenses, leaving a balance of £271,162, compared with £217,681. The final dividend is at the rate of 3s. per share, making 5s. per share, or 25 per cent. on the increased capital, compared with 20 per cent. for 1934-35. This absorbs £63,307, and the directors also propose transferring £100,000 (against £40,000) to general reserve, which leaves £33,362 to be taken forward.

Electrolytic Zinc Co. of Australia.—A sharp rise in profits for the twelve months ended June 30 last is shown in a preliminary statement cabled from Australia. The directors state that the net profit, after providing £145,000 for amortisation and depreciation and £75,403 for taxation amounts to £322,863. This compares with net earnings of £256,020 for the previous year. For 1935-36 the dividend on the ordinary shares was doubled at 10 per cent., with an interim of 4 per cent. and a final of 6 per cent., and an extra payment of 2 per cent. was distributed on the participating preference shares, making 10 per cent. for the year. The authorised capital is £3,000,000, of which £2,600,00 is in issue in £1,500,000 8 per cent. cumulative participating preference shares and £1,100,000 ordinary shares.

Herbert Green and Co., Ltd.—On the application of the Law Debenture Corporation, trustees for the debenture holders, Sir Albert Wyon, of Price, Waterhouse and Co., has been appointed receiver. The company was formed in April, 1934, to acquire the benefit of a licence for the manufacture of lubricating oils by the Duo-Sol solvent refining process. The authorised and issued capital is £350,000, of which £300,000 is in 7 per cent. cumulative preferred ordinary £1 shares and £50,000 in ordinary 1s. shares. In September, 1934, £150,000 of 6 per cent. first mortgage debenture stock was issued at par. Progress in completing construction of the refinery at East Halton, Lincs., was held up by the late delivery of new plant and equipment. In a progress report issued in March, however, it was stated that all sections of the lubricating refinery had reached the production stage.

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

British India.—The British Trade Commissioner at Calcutta reports that the Indian Stores Department is calling for tenders (Contract No. M.8572) for the supply and delivery of quantities of turpentine, white spirit and rosin as and when required during the period March 1, 1937, to February 28, 1938. The total value of the materials purchased during the period March 1, 1935, to February 29, 1936, amounted to Rs.1,49,742. Tenders should be addressed to the Indian Stores Department, Miscellaneous Branch, New Delhi, where they will be received up to November 9, 1936. (Ref. T.18.)

South Africa.—The orchardists' supplies section of a well-known firm established at Cape Town wishes to obtain the representation of United Kingdom manufacturers of mineral oil emulsions for tree spraying. (Ref. No. 307.)

South Africa.—A manufacturers representative established at Durban wishes to obtain the representation of United Kingdom manufacturers of antiseptics. (Ref. No. 308.)

South Africa.—The British Trade Commissioner at Johannesburg reports that the Public Works Department of the Union is calling for tenders (Contract No. P.W.D. 44/5410) for the supply, delivery and erection at the new cold storage block of the Ouderstepoort Bacteriological Laboratory of ammonia refrigerating plant, brine coolers, pump and piping, water cooling unit, pump and connections for supply of cooling water to condensers and air washing unit including fan, motor, pump and ducting for hanging hall. Tenders will be received in Pretoria up to November 6, 1936. (Ref. T.2070.)

Belgium and Grand Duchy of Luxemburg.—An agent, who is also a qualified textile and colour engineer, established at Brussels, wishes to obtain the representation, on terms to be arranged, of United Kingdom manufacturers of colouring and finishing materials for enamelware; dyes for the textile industry. (Ref. No. 313.)

France.—An agent established at Paris wishes to obtain the representation, on a commission basis, of United Kingdom manufacturers of iron oxide. (Ref. No. 316.)